the OIL AND GAS JOURNAL

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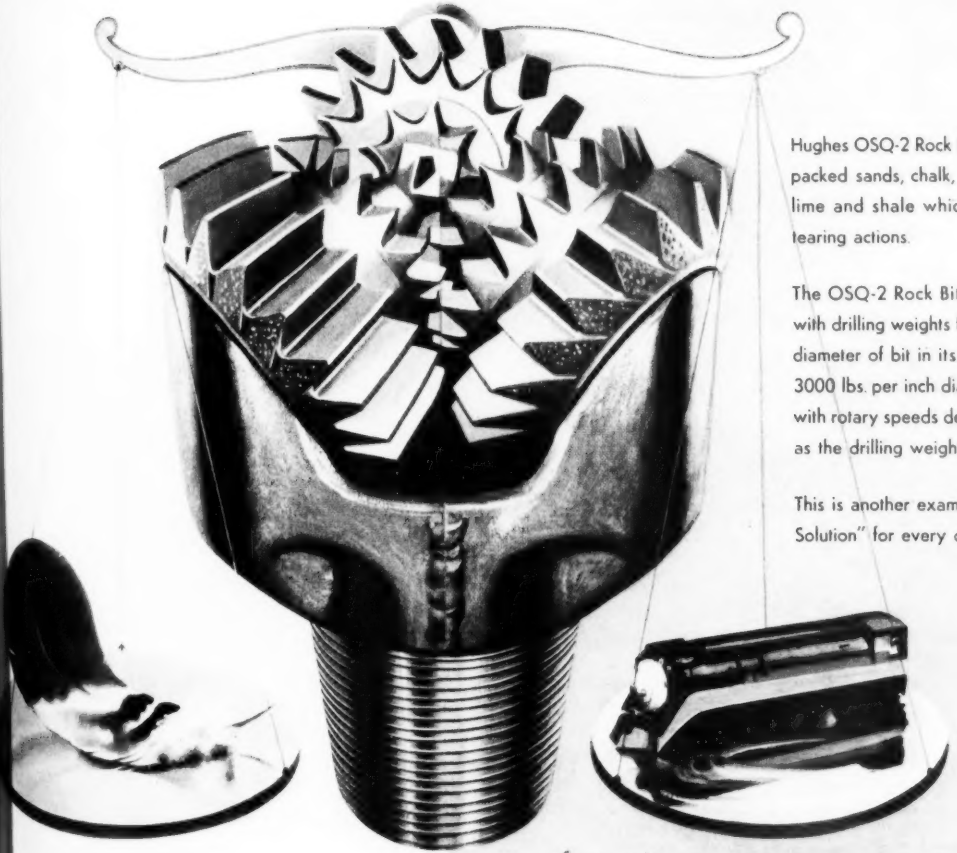

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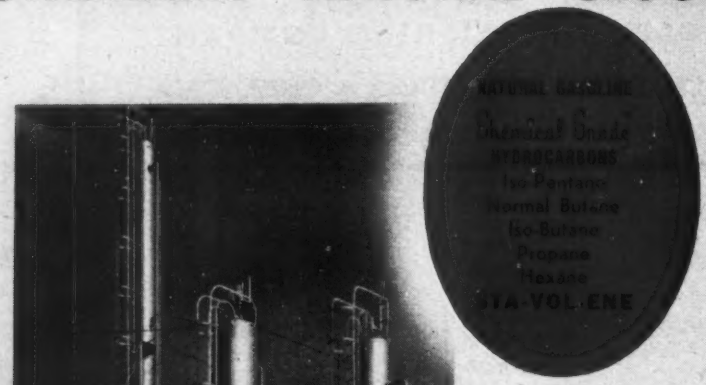
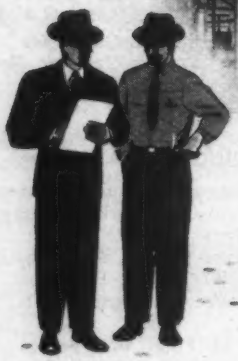
POWER-WISE BLENDERS USE WARREN STABILIZED NATURAL GASOLINE





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THE OIL AND GAS JOURNAL

Penny Wise

POSSIBLY no reader ever expected this page to question the wisdom of a program to reduce any part of our federal expenditures. We have agreed with those who in recent years repeatedly have warned of the dangers inherent in a weak policy of constantly expanding the costs of Government, and we looked forward to a return to sanity at Washington as basic in the reestablishment of a sound national economy.

With federal spending 20 months after the close of the war 5 times what it was in the heyday of the New Deal thirties and 12 or more times that of the late twenties, there is now more reason than ever before to reduce outlays for the new year which starts July 1. But it is difficult to follow the reasoning behind certain reductions approved by the House which will cripple departments of Government rendering essential services to business and the public.

What has happened to the federal taxpayers' dollars over the past 20 years is quickly revealed by placing 1927, 1937, and 1947 expenditures by major items in parallel columns. This comparison will show that the increases of a decade ago in large measure were due to forced spending and gratuities by an administration dominated by political expediency. The much greater increases of today, aside from the interest on a staggering national debt, are mostly accounted for by the military and associated activities plus a continuance of the various types of handouts.

The petroleum industry and all business through the years have come to rely upon and to use the various statistical services of the Departments of Interior, Labor, and Commerce, which are now to be curtailed or ended entirely. Oil operators have felt that the modest outlays required for the petroleum work of the United States Geological Survey were justified. They had hoped that the newly created Oil and Gas Division of the Interior Department would be permitted to function until it could be determined what type of industry-government organization was needed.

The suggestion from the House committee that the oil industry arrange to continue the government services at its own expense comes in extremely bad taste and reflects the confused thinking of those who are directing present budgetary plans. This industry and all business that stands on its own feet have paid in taxes a thousand times over for every service it has received from Government.

"Penny Wise and Pound Foolish" is as dangerous in its applications to the curtailment of government expenditures as it is in all economy programs. The pounds in this case are the many billions being spent in nonproductive activities which can only be supported so long as there are taxes available from remunerative enterprise. Surely those who pay the bills are entitled to the little they are getting in services at Washington.

Foreign Oil Vs. Self-Sufficiency Debated at Chamber Meeting

by Henry D. Ralph

WASHINGTON.—Whether the United States should depend on foreign oil and minerals or strive for self-sufficiency was debated—but not settled — at the natural - resources symposium held in connection with the annual convention of the Chamber of Commerce of the United States here last week.

Merle Becker, vice president of W. C. McBride, Inc., St. Louis, defended the view of independent oil producers that foreign oil is both an actual and a psychological threat to the development of new petroleum reserves in this country.

Harry H. Hill, former Bureau of Mines engineer and now executive assistant in the production department of Standard Oil Co. (N.J.), expounded the view that while much more oil remains to be discovered it will be necessary or at least desirable to utilize considerable quantities of foreign oil.

Imports of petroleum, Becker said, are increasing at a more rapid rate than demand in this country and taking a larger and larger part of the market formerly supplied by the domestic producer. He attributed this largely to the fact that the war held down development of new productive capacity in the United States but stimulated it abroad.

Would Discourage Domestic Producer

Actual imports, knowledge of huge foreign production at low costs, and continual talk that we must depend more on oil from abroad discourages domestic operators who must figure on many years of production to return investments in exploratory activities, Becker told the gathering.

"The will to destroy competition in American oil does not need to be inspired by malice or implemented by evil intent," said Becker. "The mere exercise of business prudence by the management of companies which hold the vast foreign reserves might well accomplish the evil through market expansion. Stimulated by government encouragement, deliberate or uninformed, it is inevitable that the markets of the United States would be captured by these companies by an ever increasing volume of foreign production.

"It would seem that the proper policy to pursue is to import only such oil as is absolutely necessary to supplement domestic production. Representatives of both importing companies and those producing only in the United States have advocated such a policy. The difficulty with such policy is that at present no means have been provided to make such policy effective."

Becker opposed further reductions in the duties on crude and petroleum products, advocated a Government-sponsored conference to agree on the volume of imports desired, and declared that an abundance of oil for the United States depends on a dynamic policy of encouraging development rather than a static policy of locking up reserves and depending on imports.

Adequacy of Supply

Speaking on the adequacy of domestic supply, Hill did not enter a plea for dependence on foreign oil. He was quite optimistic that much more oil will be discovered in the United States but he warned that there is no definite assurance of this. However, he cited estimates of production and demand during the next few years to show that unless new discoveries are brought in at a more rapid rate than recently, domestic output will fail to meet all demands with the result that exports of petroleum will decline and disappear while an increasing porion of the demand will be met by imports. After discussing the possibilities for production of synthetic liquid fuels, Hill said:

"Considering the various sources that may be utilized, it is believed that supplies of hydrocarbons are adequate to meet the domestic demand for petroleum products for many generations. It appears advisable, however, to use the relatively light domestic crudes for the manufacture of motor fuel and lubricants and to import the necessary quantities of heavy crude oil and fuel oil to balance the over-all demand. Fortunately, large reserves of crude oil have been found in foreign countries and, if necessary, increasing quantities of that oil can be made available to supplement our domestic supplies."

Sen. George Malone of Nevada, called on for impromptu remarks, made a vigorous attack on government control, bureaucratic red tape, and advocates of a planned economy. The policies that former Secretary Ickes imposed on the Interior Department have set the mineral industries back 25 years, he asserted, and it is time to get the Government back to fundamental principles. The senator declared that the Bureau of Mines should stop trying to fix mineral policy and control the industry and should confine itself to research, and the Geological Survey should stick to map making and not try to prospect. He also attacked the Securities and Exchange Commission and the tax laws for keeping venture capital out of the mineral industries.

Aid for Foreign Operations Asked by U.S. Chamber

WASHINGTON.—A number of resolutions of interest to the oil industry were adopted by the Chamber of Commerce of the United States at its thirty-fifth annual meeting here. Among these were the following:

"Petroleum.—Our Government should foster private enterprise of its nationals in foreign exploration, production, transportation, refining, and marketing of petroleum and its products. It should give the necessary and appropriate diplomatic support under the principles of international law to its nationals engaged in foreign oil operations and should itself refrain from entering directly or indirectly into the oil business.

"Public lands.—Continued acquisition of real property by the federal Government imposes severe burdens on many communities through the removal of such property from local and state tax rolls. Wherever possible, the federal Government should lease or contract for the use of lands it requires rather than acquire fee simple title thereto.

"Bureau of Mines and Geological Survey.—The Bureau of Mines and the Geological Survey of the U. S. Department of the Interior should be maintained at high efficiency in order that they may continue their assistance to the mining and other industries.

"State Geological Surveys.—Every state should give adequate financial support to a state geological survey or mining bureau, staffed by well-trained personnel, and free from political interference.

"Acquired lands.—The Surplus Property Act should be repealed with respect to disposition of lands and new legislation enacted applicable to all 'acquired lands' to provide: (1) That all acquired lands not necessary and useful for a clearly defined governmental purpose be disposed of; (2) that, in case of sale, all lands so disposed of be sold in 'fee simple' without the reservation to the Government of mineral and oil or gas rights. . . ."

Amendments Action Premature, FPC Chairman Testifies

WASHINGTON.—The Natural Gas Act should not be amended in an atmosphere of haste and urgency under the pressure of an alleged emergency, Chairman Nelson Lee Smith of the Federal Power Commission told the Senate interstate-commerce committee.

He declared that the commission is not doggedly opposed to revision of the law, that the subject should be dealt with comprehensively instead of piecemeal, and that Congress should take the same care in amending it that was taken in its original drafting. He urged, therefore, that congressional action be postponed until FPC has completed its report in the natural-gas investigation and the Supreme Court has ruled on the Interstate Natural Gas Co. case.

The Senate committee's hearing was brief, and included only two witnesses in addition to Smith. One was Rep. Ross Rizley of Oklahoma, author of one of several bills to amend the act, who summarized the arguments for the various provisions. The other was Tom J. McGrath, attorney for coal and railroad interests, who sketched opposition to this measure and arguments in favor of expanding FPC control over certain phases of the gas industry. The committee incorporated in its record the extensive hearings already held by the House committee on interstate commerce and indicated that it would also take notice of further hearings to be held soon by the House group.

Critical of Both Bills

Chairman Smith was critical of both what he labeled the "gas industry bill" and the "coal industry bill," the former because it seeks to deal only with the complaints of certain interested parties, the latter because it would lay down "policies" in such generalized language as to create controversy and make administration difficult.

However, he said, there is some merit in both measures and some of the proposed amendments, after mature and balanced consideration, may be found necessary and desirable. He insisted that action now would be premature, hasty, and ill-considered because adequate basis for a sound, over-all evaluation from the standpoint of the broad public interest would be lacking.

The FPC, its chairman said, undertook its natural-gas investigation for the express purpose of ascertaining what amendments should be made in the law, so it is only proper to wait a few months until this report can be completed. There is no urgent need for hasty action, he said, ridiculing the idea that the present gas shortage is due to the commission's actions or the fear of producers to sell gas. He cited statistics to show that the gas shortage is due to inability to obtain sufficient steel for pipe lines and compressors and that the commission has been authorizing new construction faster than the companies can complete it. He intimated that producers are holding their gas more in anticipation of higher future prices than through fear of regulation by FPC, and added that all the applicants for new trunk-line construction have been able to show that they had ample gas reserves for their anticipated markets.

"Far from being in dire straits calling for heroic measures of relief, it would be hard to find a more lusty, growing industry," Smith said, insisting that there is no reason for Congress to deny itself the advantage of unhurried consideration.

Denies Regulatory Ambitions

Although he did not discuss the provisions of any of the bills in detail, Smith dwelt at some length on the allegation that FPC is attempting to regulate gas sales by independent producers. He insisted that the commission never had and never would make such an attempt, and that there is nothing in its decisions nor the recent staff report on production and gathering to give this impression. The commission's ideas as to "different treatment" for rate-making purposes of gas produced by a transmission company and that purchased from others will be made clear when that chapter of its report is completed, he said. He added that it is not true, as implied by some witnesses, that the commission limits a pipe-line company to a fair return on producing wells only without full recovery of all costs actually incurred in drilling dry holes.

Discussing the controversial Interstate company case, Smith said an alarm had been raised not so much because of the FPC action but because of certain inferences drawn from legal language used in sustaining this action. He explained that in this case the company avoided state regulation of the gas sales in question by pleading that this business was interstate commerce, and that the federal act was passed expressly to cover such situations. This has raised a demand for clarification of FPC jurisdiction over sales to interstate pipe lines, and the matter is now before the Supreme Court. Smith said that since it is uncertain just what the present law is, it would be unwise to amend the law until a final decision has been rendered.

Alexander Heads Shell's Mid-Continent Division

W. A. Alexander, manager of the Houston area of Shell Oil Co., Inc., has been elected vice president of the company in charge of the Mid-Continent division with headquarters in Tulsa, succeeding Ralph B. Roark, who retires due to ill health effective July 1. Roark joined the Shell organization in 1918 as a field employe and was appointed production manager of the Mid-Continent division in 1927. He became vice president in charge of Tulsa headquarters in 1937.

W. A. ALEXANDER

Alexander has been connected with the Shell organization in various operating capacities since 1928. He spent some time at The Hague, Netherlands, headquarters of Royal Dutch-Shell, and when he returned he was made production superintendent in Louisiana. Later he became assistant production manager at Houston and in 1944 was placed in charge of the Houston area. He is a graduate of Louisiana State University.

Joe T. Dickerson, an attorney for the Shell company, will succeed Alexander as manager of the Houston area. Sherwood Buckstaff, manager of the exploration department at Tulsa, will become a member of the Shell regional exploration staff at Houston. He will be succeeded at Tulsa by R. E. McAdams, who joined the Shell organization in 1936.

Jersey Standard Denies Statements In Farben Indictment

NEW YORK. — Data showing that the United States received more valuable technical information from Germany than was ever given by American scientists were cited this week by Robert T. Haslam, vice president and director of Standard Oil Co. (N. J.)

Haslam's remarks were made in a denial of statements contained in the U. S. Government's indictment of 24 top I. G. Farben officials that a contract between Farben and Jersey Standard retarded production of certain strategic war products in the United States. Haslam said that Jersey Standard's files, knowledge, and other facilities will be available to the Government in the Allied prosecution of the German officials.

No cartel arrangements restricted prices or production between the companies, Haslam said, adding that among American patents purchased for $35,000,000 plus exchanging some Jersey patents, the Jersey company received patents for many processes of great wartime value.

"One was for 100-octane gasoline for our aircraft when Germany itself only had 90 octane," he said. Explaining the paratone patent, Haslam said, "This was especially vital during the first 2 years of the war in connection with recoil and hydraulic oils and also was highly useful as an insulator in the early production of radar equipment. Paratone in recoil and hydraulic oils was used on practically all American naval ships, tanks, planes, and heavy artillery until a better substitute was developed.

"The Germans never made a pound of synthetic rubber from the butyl process they got from us. They did not have the raw material. Buna rubber was developed almost wholly in Germany, and most of the basic knowledge of buna manufacturing came from Germany. But Standard Oil Co. (N. J.) found processes to make raw material from buna on a large scale and cheaper than the Germans were able to make it.

"Practically all buna made from oil during the war used that process. Approximately 70 per cent was made from oil and 30 per cent from alcohol. Farben gave us part of the buna process in 1930 before Hitler and the rest by 1939. Proof of this is seen in the fact that when the United States decided to build buna plants those plants got into production immediately."

Stone Oil's Refinery Partially Reopened

FIRST units of the heavily damaged Stone Oil Co. refinery at Texas City already have been put back into operation. Although buildings, tanks, and pipe lines were badly damaged, distillation equipment and the company's treating plant, boilers and water system escaped with only minor damage, company officials said.

Eight tanks were destroyed, eight others badly damaged, and 12 more slightly damaged. Every building in the plant sustained from minor to 50 per cent damage. Pipe-line damage was extensive, with a part of the system destroyed. Two employes, Meyer J. Hurwitz, superintendent, and A. B. Emsoff, foreman of the mechanical department, were killed in the April 16 blast.

A late survey of damage at Atlantic Refining Co.'s plant showed that seven storage tanks were buckled by the blast.

Stockholders of Monsanto Chemical Corp., most heavily damaged of the Texas City installations, were sent a report signed by Edgar M. Queeny, chairman of the board, outlining the damage at the plant and correcting erroneous statements which had received wide circulation.

California Research Forms New Division

Formation of a new division, headed by E. G. Gaylord, vice president and director, has been announced by California Research Corp., subsidiary of Standard Oil Co. of California, to coordinate and expand the company's oil-field research activities.

The new division will include laboratory and research services for Standard and its affiliates. Activities will include geological, geophysical, drilling, producing, and surface processing work. The laboratories will be housed in a new structure at La Habra, Calif.

Plans for construction of a new laboratory building at El Segundo, Calif., also have been announced by California Research. The building, 54 by 160 ft., will centralize all Southern California technical research and development work on petroleum products and refining processes at Standard's El Segundo refinery.

Champlin Buys 46 Wells; Other Deals Closed

IN a deal reportedly involving $4,000,000, Champlin Refining Co., Enid, Okla., early this week bought most of the holdings of Denver Producing & Refining Co., Oklahoma City, in West Edmond field, Oklahoma.

Included in the purchase were 43 Hunton lime producers and 3 Bartlesville sand producers, 3,000 acres of productive land and 560 acres of undeveloped leases. Pipe lines and pump stations operated in connection with Denver's refinery in the field were not included.

In another major purchase recently, Standard Oil Co. of Ohio has announced it is exchanging stock for a 2 per cent interest in Texas Pacific Coal & Oil Co. and about a 3 per cent interest in Barnsdall Oil Co.

C. T. Foster, vice president, said the company, now producing about 25,000 bbl. of crude a day, or 30 per cent of its needs, still is short of crude oil for refining requirements.

Four sales involving producing properties in Texas and Oklahoma also have been disclosed.

Brazos Oil Co., subsidiary of Dow Chemical Co., announced the purchase from Pure Oil Co. and others of a 6,000-acre block containing seven large gas wells in Collegeport gas field, Matagorda County, Texas. Sale price was reported to be $2,000,000.

Bay Petroleum Corp. announced purchase of the W. H. Hammon properties in Madden field, Wichita County, for a consideration "substantially in excess of $1,000,000." Included was an undivided one-half interest in 27 producing wells. The properties will give Bay its first production in North Texas.

In another Texas sale, J. Fred Schoellkopf and associates of Dallas sold five producing wells in the Rusk County portion of East Texas field to A. B. Diffie, O. R. Seagraves, and J. A. Humphrey of Dallas for $283,000.

R. L. Robb and associates, Dallas, bought 16 producing wells on 240 acres of land in Soldier Creek pool, Cotton County, Oklahoma, from W. H. Peckham, Wichita Falls, for a reported cash price of $450,000. Daily production of the wells was reported to be 550 bbl.

this week

MARKETING—California Standard cuts tank-wagon gasoline prices 0.3 cent in response to President's appeal, though R. G. Follis, company president, declares reduction not justified considering crude and manufacturing costs. . . . ¶Soaring fuel-oil market features Mid-Continent trading. . . . Some spot-market No. 6 reported sought at $2.25 bbl. in the face of active bidding by buyers. . . . Indiana Standard makes 10-cent upward adjustment in Rangely crude schedule. . . .

ANTITRUST—U. S. Department of Justice files second West Coast case aimed at breaking up what it declares to be illegal exclusive-dealer contracts by oil companies. . . . Richfield named defendant in civil action similar to earlier case against California Standard. . . .

REFINING—Harry F. Sinclair announces in Houston some $35,000,000 will be spent in improvements in Houston refinery as a part of over-all company refinery expansion program. . . . ¶Root Petroleum announces it will spend from $500,000 to $1,000,000 modernizing the government plant at El Dorado, Ark., for which WAA accepted Root's purchase offer. . . . ¶Stone Oil officials place back in operation some units of the company refinery, heavily damaged in the Texas City explosion. . . .

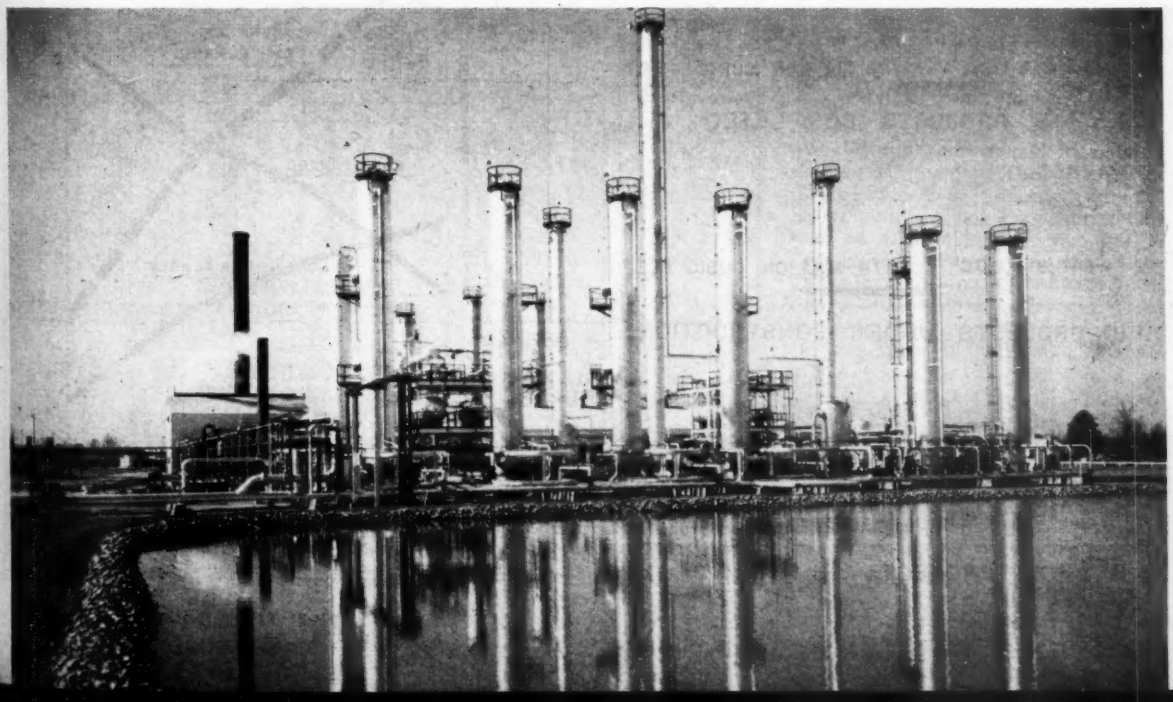
FPC—Nelson Lee Smith, FPC chairman, tells Senate committee conducting hearings on amendments to the Natural Gas Act that action by Congress would be premature, that the subject of revision of the law should be delayed until the commission's reports in its natural-gas investigation are complete and the Supreme Court has ruled in the Interstate case. . . . ¶Berton N. Behling nominated by President Truman to the FPC post of Richard Sachse who is resigning because of ill health. . . .

PIPE LINE—Rocky Mountain Pipe Line, Continental subsidiary, discloses plans to enlarge Colorado-Wyoming line at cost of $2,300,000 to provide more crude needed as a result of the expansion of Continental's Denver refinery. . . . ¶U. S. Government rejects all 25 bids received for Canol 1 project. . . . Offers ranged up to $1,500,000. . . .

DEEP DRILLING—Superior of California 51-11 Weller, world's deepest well, is below 17,236 ft., drilling being resumed May 5 after successful removal of drill pipe stuck 11 ft. off bottom. (See The Oil and Gas Journal's Special Section, March 29, pages 149-169.) . . . ¶Texas Co. test, Willacy County, Texas, sets new depth record for South Texas at 16,006 ft. . . . ¶Mountain Fuel Supply well in Church Buttes field, Uinta County, Wyoming, coring below 12,994 ft.—record for Rocky Mountain area. . . .

EXPLORATION—Production in Wolfcamp zone of Permian gives Fullerton field, Andrews County, Texas, fifth producing horizon. . . . ¶Magnolia Petroleum test finds new, deeper pay zone in South Halderman area, Jim Wells County, at 6,001 ft. . . . ¶Amerada completes discovery well of Bloomington field for 157 bbl., flowing potential. . . . ¶Union Producing completes well extending Tuscaloosa sand production 1/2 mile in Big Island field, Rapides Parish, Louisiana. . . .

One of the many new plants utilizing wet gas in Texas and located in Carthage field—which is furnishing much of the natural gas to the Big Inch system—is this condensate-natural-gasoline-recovery plant of United Gas Pipe Line Co. near Carthage. It is designed to process 150,000,000 cu. ft. of raw gas daily and extract from it 170,000 gal. of liquid products. It has storage for 2,768,000 gal.



Texas Will Have 69 Gas-Conservation Plants Costing $127,000,000

by Ernest O. Thompson

Oil and gas conservation has come a long way since the days when a gas well was allowed to blow its head off in the hope that it would blow into an oil well, according to the author, who told the attendance of last week's A.G.A. meeting what Texas is doing to stop this waste. The accompanying article is a portion of Thompson's address at the convention. Thompson is chairman of the Texas Railroad Commission.

IT is notable that the average daily production of oil in Texas for 1939 was 1,305,617 bbl.—but that by 1946 it nearly doubled to an average of 2,070,959 bbl.

In 1939 the average daily casing-head gas production as an incident to the oil production was 1,730,000,000 cu. ft. During 1946 the average daily casing-head gas production in Texas was 2,744,000,000 cu. ft. Thus, as the oil increased, the casing-head gas production also increased, and it almost doubled that of 1939.

Casing-head gas utilized in 1939 was 768,000,000 cu. ft. per day.

During 1946 we increased our utilization of casing-head gas to 1,555,000,000 cu. ft. daily. This was almost a 100 per cent increase in the conservation of this natural resource, which is an incident or accompaniment to the oil production.

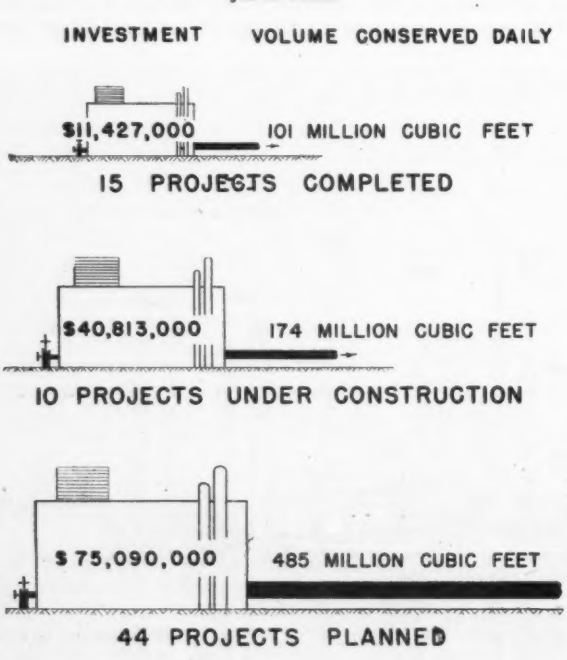
It is also of interest that as of April 10, 1947, as a result of all the Texas Railroad Commission hearings on the conservation of flared casing-head gas incident to oil production, 15 extraction and compression plants have already been completed in Texas at a cost of $11,427,000. They will conserve 101,000,000 cu. ft. of gas per day which has been flared. Furthermore, 10 plants are now under construction in Texas and will be in operation either by the end of 1947 or the middle of 1948. They will cost $40,813,000, and they will conserve 174,000,000 cu. ft. of gas per day.

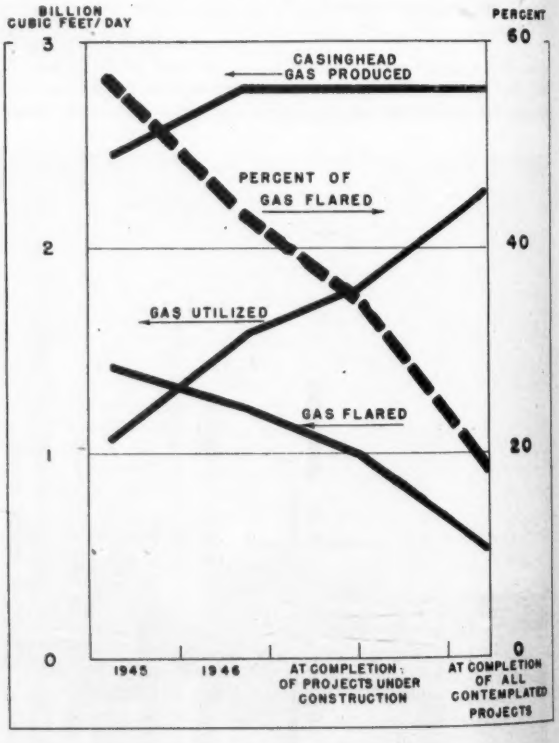
Also at these same hearings testimony showed that 44 projects are now being planned and will be in operation in the early part of 1949 or the middle of 1949 at a cost of $75,090,000, and will conserve 485,000,000 cu. ft. of gas per day.

This totals 69 plants completed, now building, and planned. Total cost of these projects will be $127,330,000, and the casing-head gas that will be conserved in these projects will total 760,000,000 cu. ft. per day. Of this amount, it is estimated that 452,000,000 cu. ft. of gas per day will be available for pipe-line transportation; 308,000,000 cu. ft. of gas per day will be injected back to the formation to maintain pressure and lift additional oil from these reservoirs.

In addition to these 15 new projects completed, between 1939 and February 1947, 36 gasoline and repressuring plants have been put in operation. As of February 1947, these plants process a daily volume of 374,000,000 ft. of gas and flare 47,800,000 cu. ft. of gas per day after processing, with the total casing-head gas utilized being 326,000,000 cu. ft. of gas per day. All of this shows that Texas operators and the Texas Railroad

Below—Money and size of Texas' casinghead gas conservation projects that are: (1) completed, (2) under construction, (3) planned. (As of March 20, 1947). Right—Trend of utilization of casinghead gas in Texas





Commission have been at this program of conservation since 1937 in as vigorous fashion as was possible, war emergency permitting.

It is interesting to note that when the plants or projects now on paper and in process of construction are completed that the percentage of the total casing-head gas in Texas flared to the air will be only 18.4 per cent, indicating a utilization in the neighborhood of 81.6 per cent.

There is in Texas at this time, regrettably, 1,153,000,000 cu. ft. of casing-head gas now being flared. When all of these existing plants or planned projects are completed, only 514,000,000 cu. ft. will be vented. This amount will be from fields which are isolated, and where at the present price of gas it is not economically feasible for us to require the gathering and processing of this gas. Naturally, as the price of gas increases and the price of liquid hydrocarbons stabilizes, the economic limits will be extended and more and more gas will be utilized. It is my thought that enlightened public opinion will support and pay for this conservation effort in a measure never before imagined. We are getting unstinted support from the general public, from the land owners, and from the operators.

During 1946, 2,768,938,762,000 cu. ft. of gas was produced in Texas. Of that total, 40.2 per cent went into pipe lines for light and fuel, and only 3.92 per cent was flared to the air.

It might be of interest to note that Texas exported to pipe lines 40.14 per cent beyond the state line, and that the gas used by pipe lines in the state is 59.86 per cent.

Experience has shown over past years that as the price of these natural gasolines and distillates is increased, the flaring of propanes and butanes which have in the past proved to be valueless, will become more and more valuable because we are taking cognizance of their true value. A number of companies in Texas have laid lines to various fields and gather the butanes and propanes, which have for years been flared to the air.

In a recent hearing on K.M.A. field in Texas held before the commission, it was shown that the butanes and propanes were flared as vapors from the gasoline plants because there was no market for them, and because the price of these liquid hydrocarbons was too low to be put into a line. Testimony showed that a market has been obtained andd these vapors will be put into a line for beneficial use. The testimony shows the market has now been obtained, thus promoting true conservation.

200,000 Bbl. Per Day

Utilization and saving of condensable hydrocarbons in Texas started from zero and has now reached the important figure of in excess of 200,000 bbl. per day. This, incidentally, is in excess of the total crude oil produced by many oil-producing states.

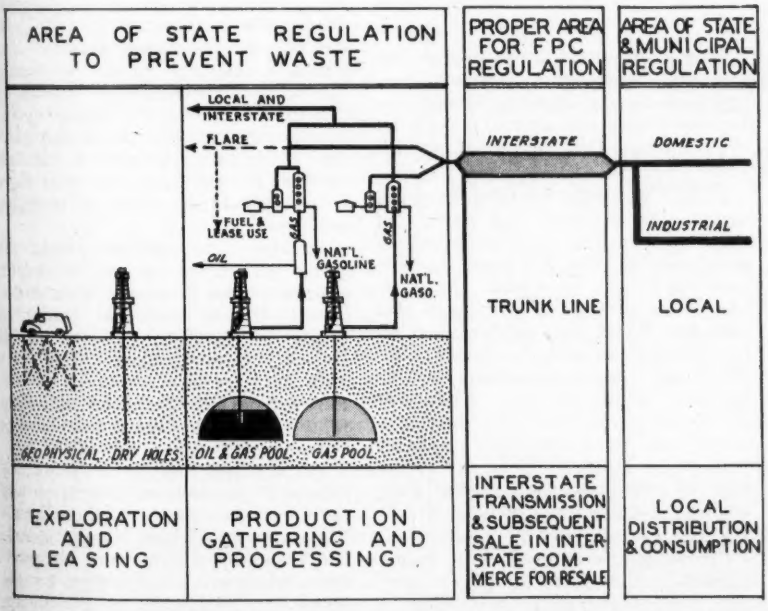
Belief in and true practice of conservation is a mark and a goal of good citizenship. Hundreds of millions of barrels of petroleum and petroleum products were consumed by the war effort. This is not an expression of regret. We drove to a great and glorious victory on the ocean, in the air, and on the sea by petroleum-propelled vehicles—planes, tanks, and ships. But the fact remains that we used up hundreds of millions of barrels of our oil for war and this war expenditure brings forcefully to our attention the necessity for even greater and more complete conservation efforts on the part of the oil and gas producers, the regulatory authorities of the states, and the general consuming public.

Present consumption of oil and gas is beyond all forecast of the expert economists. The refining capacity of the nation will be taxed to meet the summer's demand. Everybody is going somewhere and going farther and going to stay longer than ever before. The pentup vacation desire of the war period is going to have full expression this summer. By the same token, the people of America have become keenly conscious of the great benefits and comfort that can come from the use of this clean, convenient fuel called natural gas. Pipe lines are being built and projected to reach most every part of the country, Pacific Coast, Middle West, and East.

Natural gas in coming into its own. The natural-gas industry will be called upon to furnish the transportation and distribution of this commodity. And it is only fair to say that the producers are entitled to a fair price for their gas at the well, just as the consumer is entitled to receive this gas at a fair price, cost and risk assumed and fair profit being given due consideration.

Right here I think that I should make the point crystal clear that it is our intention in Texas to see to it that the fruits of conservation shall be given first place in the demand picture. I mean by that that the liquid hydrocarbons extracted from casing-head gas produced with oil must be used by the refiners of our nation, and the Texas Railroad Commission intends to give them first place in the allocation to meet market demand for petroleum. Then after this gas has been processed and the liquid hydrocarbons removed, we intend to allocate this residue gas to first place in the market demand for natural gas, filling the remainder of the market demand from dry-gas wells which can be prorated to fill the remainder of the market demand.

The reason for this is that this natural gas must be used. Of course, in certain fields the prime use is to return it to the reservoir to maintain pressures and to lift more oil, but in cases where that is not feasible or economically desirable, then it would be folly and unpardonable in the eyes of public opinion and good conservation for this gas to be flared.



A plan for natural gas—from the "finding" stage through to its ultimate points of utilization. (Note: The accompanying three charts, which Thompson used among others in illustrating his address, were originally presented by Hines H. Baker, executive vice president of Humble Oil & Refining Co., in testimony before the Interstate and Foreign Commerce committee of the House of Representatives, U. S. Congress, on April 5, 1947)

International

WORLD-WIDE OIL DEVELOPMENTS

Plans for Dredging Maracaibo Bar Well Advanced, Minister Says

WASHINGTON.—Plans for dredging the bar at the mouth of Lake Maracaibo to permit the entry of ocean-going tankers and other vessels are well advanced and prospects are good that the project will be undertaken in the relatively near future, according to Perez Alfonso, Venezuelan minister of fomento, who has been visiting the United States in connection with this and other matters.

At the request of the Venezuelan Government, United States Army Engineers have recently completed a survey of this project and also a proposal for opening the mouth of the Orinoco River to ocean vessels. Both projects were reported to be feasible from an engineering standpoint, and economic studies are now being made to determine how they are to be financed and the benefits they will bring to the development of the country.

The Orinoco project is desirable primarily to facilitate the export of iron ore but it would also hasten the development of a large area in the interior of Eastern Venezuela since the river is navigable for a great distance above its delta. Several of the oil fields recently developed in Eastern Venezuela, such as the large Temblador, are relatively close to the Orinoco and would thus be provided with additional transportation facilities.

The Maracaibo project, which has been under active consideration since before the war, is more advanced in planning than the Orinoco project and probably will be undertaken first. Lake Maracaibo itself is deep enough for ocean vessels but the bar across its mouth has only 18 ft. of water. The project calls for dredging a channel to a depth of 35 ft., which would accommodate the largest tankers.

At present petroleum exports from the Lake Maracaibo area must be handled in specially designed shallow-draft tankers, with the result that most of it goes to the refining centers of Aruba and Curacao in the Netherlands West Indies just off the coast of Venezuela. Opening the lake to ocean tankers would not only reduce the cost of this movement but might also have a long-range effect on the economics of the petroleum industry in that area.

Water-borne traffic through Lake Maracaibo amounted to 36,000,000 tons of petroleum and about 300,000 tons of general merchandise last year. The Maracaibo basin is said to be very rich in resources and promising for the development of cattle and agricultural products, so much other cargo is expected to develop when the project is completed. The project will also provide a new outlet for a considerable area of Eastern Colombia.

New Law Causes Further Delay in Normal Operations in Japan

NORMAL competitive postwar oil operations in Japan will not be in effect for at least another year.

This is the direct result of the "Petroleum Distribution Kodan Law" approved by the supreme commander for the Allied powers and passed by the Japanese Diet March 31 of this year.

P.D.K. is slated to take over all distribution facilities and powers of the Petroleum Distribution Co. which since July 6, 1946, has been the sole distributor of petroleum products under the minister of commerce and industry. P.D.K. can be dissolved by nullification of the temporary demand and supply-adjustment law or by order of the director general of the Economic Stabilization Board. In either case, P.D.K. becomes "null and void as of April 1, 1948, or at the time of the dissolution of the Economics Stabilization Board, whichever the earlier date."

Oil companies interested in seeing Japan's economy return to a normal competitive basis have quietly voiced surprise at the formation of the Japanese Government-dominated oil setup as it is just another barrier, they point out, to normal competition. Moreover, the same sources state, if by chance a peace treaty is signed with Japan, as General MacArthur advocates, in the near future, it is entirely possible that P.D.K.'s activities might be continued by the Japanese Government on the theory that it was set up by the Allied powers; that the Allied powers must have thought it the best method of operation; and that there is no immediate need of changing the law.

P.D.K. is to operate within the quota system set up by the director general of the Economic Stabilization Board. It will have an authorized capital of 60,000,000 yen (no official United States exchange rate yet), with the working capital to be obtained from the Japanese equivalent of the U. S. Reconstruction Finance Corp.

P.D.K.'s functions will include the sale and purchase of petroleum and petroleum products at prices established by the Price Board; storage and blending of petroleum and products; distribution; arranging for the necessary transportation; and the appointment of authorized dealers. *(For additional details on postwar oil operations in Japan, see The Oil and Gas Journal, April 19, page 70, and May 3, page 45.)*

U. S. Group Organizes to Promote Romanian Trade

International

WHETHER the newly organized American Romanian Trading & Development Corp. proves successful depends largely upon whether Romanian industrialists can convince the Russian-dominated Romanian Government that exports are a prime necessity in that country's postwar economy.

"It's worth a try," is the consensus here in New York among officials of Standard Oil Export Co. and the other nine companies which comprise the nonprofit organization registered in New York with an authorized capital of $1,000,000.

Ralph B. Bolton, producing executive of Standard Oil Co. (N.J.) handling production problems in Europe, North Africa, and the Middle East, has been elected president of the new enterprise. The U. S. State Department and Romanian officials in Washington have been informed about the aims of this organization and have taken cognizance of its scope. However, no government representatives, American or Romanian, are connected with it. Frank W. Bolling, president of Standard Oil Export Co., will handle the business end of petroleum-product exports from Romania and act as coordinator.

Other Stockholders Named

Other United States stockholders in the corporation are: International Telephone & Telegraph Co.; Westinghouse Electric International Co.; R. B. Rogers Corp.; Redwood Corp.; Thonet Brothers Lumber Co.; Continental Grain Co.; National Supply Co.; Bowmall Co., Inc., and Occidental Trading & Investment Co.

Commenting on this new enterprise, Bolton says that since World War II has severed past economic ties between the United States and Romania, the need was felt for the creation of a new organization to facilitate trade between the two countries so as to increase Romania's productive capacity and thereby make additional exportable commodities available.

The new company hopes to open an important trade channel between the United States and Romania in addition to those already existing. By this development, Bolton explains, Romania's purchasing power abroad will be increased and aid given to raising the standard of living within that country.

As Romania has surplus refining capacity and as there is a law prohibiting the export of crude, petroleum exports will be confined to products. Oil officials anticipate the gradual resumption of bulk exports, by tankers, to central and western Europe as well as to certain Mediterranean areas. *(For additional recent details on Romania's petroleum outlook, see The Oil and Gas Journal, April 5, page 44.)*

Moscow to Improve Gas Service With New Plant

Construction is scheduled to begin soon on a $6,000,000 natural-gas storage plant near Moscow to provide gas to meet peak loads and serve as standby service, J. B. O'Connor, vice president of Dresser Industries, Inc., has announced.

O'Connor said a contract for the project already has been signed with Soviet authorities. Construction is scheduled to be completed late in 1949.

The plant is scheduled to take 4,000,000 cu. ft. of natural gas a day from the Moscow-Saratov pipe line, liquefy it by a process of refrigeration, and store it at —246° F. under a pressure of 15 psi.

The new plant, he said, will provide storage for 162,000,000 cu. ft. of gas, which as a liquid can be stored in a small area. The liquid can be regasified quickly and turned into distribution lines during periods of peak demand. The new plant is expected to give the Moscow area a natural-gas system capable of meeting peak requirements and interruptions in pipe-line service.

New Oil Corporation Approved in Peru

ESTABLISHMENT of a Peruvian Petroleum Corp., presumably to permit the government to enter all phases of the petroleum industry if and when it chooses, has been approved by the Senate and sent to the president for his signature.

The bill provides that the corporation shall be of indefinite duration and liquidated only by act of Congress, according to the Foreign Commerce Weekly of the U. S. Department of Commerce. It also provides that 75 per cent of the shares are to be subscribed by the state and 25 per cent by Peruvian capital, with the latter guaranteed a 4 per cent per annum return by the government.

So far, the Peruvian Government is only in the crude-oil producing business, having, in 1939 through the Ministry of Development and Public Works, formed Establecimiento Industrial de Petroleo de Zorritos. Today, this company has a small production of around 200 bbl. daily in the Zorritos district.

Meanwhile, reports from Peru indicate that the government is preparing to drill a well in the Agua Caliente district near the producing properties of Ganzo Azul Petroleum Co., Ltd.

Creole's March Production Declines

AVERAGE daily crude-oil production in Venezuela of Creole Petroleum Corp. showed a slight drop in March, compared with February's all-time high, but refinery runs were up about 8,000 bbl. daily.

Creole's March production averaged 594,544 bbl. daily, compared with 599,192 bbl. daily in February. Of the March total, 442,240 bbl. came from Lake Maracaibo area and Cumarebo and the remaining 152,544 bbl. from eastern Venezuela.

March refinery runs averaged 45,889 bbl. daily, compared with 37,635 bbl. daily in February. In March, 37,231 bbl. were refined at Caripito and 8,658 bbl. daily at La Salina.

Fifteen oil wells were completed in the company's development program, and four wildcats were brought in as oil producers. No dry holes or gas wells were reported. The fields where the development wells were completed, their average initial production and depth follow:

Jusepin, six, 286 bbl., 4,248 ft.; Bolivar Coastal (B.C.F.), four, 897 bbl., 3,853 ft.; Mulata, three, 360 bbl., 5,437 ft.; Cumarebo, one, 201 bbl., 1,896 ft.; and Quiriquire, one, 386 bbl., 4,080 ft.

Creole's wildcat activity showed one oil well completed in each of the following fields, with average initial production and depth also shown: Jusepin area, 480 bbl., 4,217 ft.; Mulata, 379 bbl., 6,300 ft.; Quiriquire, 240 bbl., 2,710 ft.; and Roble, 450 bbl., 5,730 ft.

In Venezuela's West Lake field, Shell's VL-1 well is being drilled by Creole. No data were reported for March.

Chinese Hold Meager Production Despite Patchwork Equipment

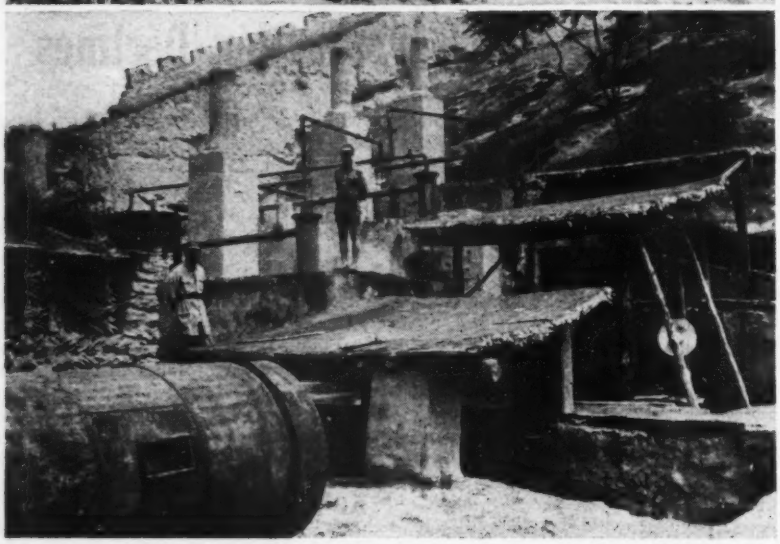
by Harrison Forman

YENCHANG, in the blockaded Communist-controlled province of Shensi, is one of the very few oil-producing areas in China.

The field was originally discovered, surveyed, and brought in by a Japanese engineer in 1906. He drilled four wells, two of which produced oil. But by 1910 he grew discouraged by the meager output and the handicaps imposed upon him by the Manchu Government from Peking, and abandoned the project.

From 1911 to 1914 the government of the new Republic of China tried to run them and then turned them over to the Socony-Vacuum Oil Co., Inc., which operated them under contract with the new Chinese Government at Nanking.

Harrison Forman, the author of this article, is a well-known explorer, author, and lecturer. He has spent some 15 years in the Far East and has been foreign correspondent for the New York Times, London Times, and the National Broadcasting Co. He is the author of three books of the Far East. The pictures illustrating this article were taken by Forman about a year ago.



Above, primitive, steam-powered rig in the Communist-controlled province of Shensi, China. Below, topping operations

Socony-Vacuum imported considerable drilling and refining equipment and dug five new wells. But when these proved unprofitable (owing chiefly to lack of efficient transport), Socony-Vacuum, too, washed its hands of the project and withdrew, leaving the equipment behind.

From 1916 until the coming of Chinese Communist armies in 1935 the Nanking Government made half-hearted efforts to operate the wells, but never could make them a paying proposition.

Today, the Communists are working hard to develop the field, realizing that the products are a precious medium for "foreign exchange" since they are permitted to cross freely into Government-controlled areas where they are exchanged for cotton cloth, machinery parts, and other badly needed materials.

The Communists admit they have no one who knows scientific oil drilling. Some of the old workmen from the days when the Japanese and Americans operated the fields, are still on the job.

41-Year-Old Steam Engine

The few steel drilling bits left by Socony-Vacuum are almost at the limit of their usefulness. The worn-out pistons in the suction pump have been covered with cloth and leather to prevent leakage. For lack of steel, sheets of slate, quarried from the river bank, are used for lining the oil-storage tanks. Improvisation and substitution are the rule. The steam engine is one installed by the Japanese engineer back in 1906; while the unit brought in by Socony-Vacuum has been cannibalized for spare parts.

The kerosene and crude oil are transported from the fields in bamboo-and-lime casks loaded on mules and donkeys. The candles made from the byproducts are of a fairly high quality, much better than any obtainable throughout hinterland China. The gasoline is mostly kept by the Communists.

From the crude oil they are able to get about 10 per cent gasoline and about 40 per cent kerosene. The monthly production is about 250 gal. gasoline, and 1,000 gal. kerosene. (Production is figured in terms of 5-gal. gasoline tins: 50 5-gal. tins of gasoline, 200 5-gal. tins of kerosene. They have no other means of measuring production).

They needed 2-in. pipe for the condenser. They were not, of course,

able to get any of it from the outside. They did, however, have plenty of 8-in. and 12-in. pipe around. So they welded the 8-in. inside of the 12-in.

The older wells have been steadily petering out. Today their total production is barely 500 gal. daily. They have been deepening some of the older wells but are handicapped in this operation for lack of proper equipment. The deepest today is about 600 ft.

For the period of 1938 to 1943 these are the percentages for increased production (mostly due to application of more efficient methods as they learn with experience). Taking the year 1938 as the base of 100 per cent, production increased to 110 per cent in 1939, 118 per cent in 1940, and 121 per cent by 1943. Total crude-oil production for 1943 was 4,708 bbl.

To the west of Shensi Province, between Mongolia and Tibet, is Kansu Province where another Chinese oil-producing area is being utilized. The presence of oil at Shih Yu Ho (Rock Oil River) in the Kansu Panhandle has been known for a long time. The oil oozed out from the rock formations and ran down to a meandering stream. Down through the centuries passing cartmen would skim off some of the crude oil for use in their native lamps. It was not until 1934-1937 that the area was scientifically surveyed.

Nothing much was done about developing this oil until the Japanese invasion of 1937 was followed by a blockade which gave urgent meaning to the slogan, "One drop of gasoline equals one drop of blood."

By 1939 the National Resources Commission of China had begun drilling operations, directed by Sun Yuehchi, an American-trained oil and coal-mining engineer. Some 40,000 tons of equipment was ordered from America in 1940. This arrived in Rangoon about the time the Japanese attacked Burma, and all but a fourth of this had to be abandoned to the enemy. The Chinese, however, were able to salvage one incomplete refinery which, with Chinese-made missing parts, was set to work.

By 1944 18 wells had been drilled, producing oil of fairly high quality. Exact figures are not available, though it is known that several million gallons of gasoline are produced yearly. This, of course, could be increased substantially with proper equipment.

The principal limiting factor is the lack of adequate transportation. A truck carrying 15 drums of gasoline, for example, will use up to 13 of them before it gets to a railhead or inland port.

The fact that plentiful quantities of petroleum products can be imported from America much more cheaply than it can be produced in China discourages proper development of the Kansu oilfields. In Yenchang, on the other hand, the demand for every drop that can be produced—in the face of a government blockade—is such that whatever the cost, production is encouraged as a vital necessity.

Two New Refineries to Be Opened This Year in Australia

THE number of refineries in Australia will be raised to four with the opening some time this year of two new plants now under construction.

Information made available to Richard F. Boyce, American consul general in Melbourne, shows the status of the Australian refining industry. The data were gathered by the State Department representative following the publication by The Oil and Gas Journal of "World-Wide Markets for American-Made Petroleum Equipment," which included a section on Australia.

The two new refineries to open in 1947 are those under construction at Paisley, Victoria, by Vacuum Oil Pty., Ltd. (Standard-Vacuum subsidiary), and at Sydney by Bitumen Oil & Refining Co. (Caltex Pty., Ltd., subsidiary). Present refineries in Australia consist of plants operated by Commonwealth Oil Refineries, Ltd., at Laverton, Victoria, and Shell Oil Co. of Australia, Ltd., at Clyde, New South Wales.

Pertinent information on the four refineries was listed as follows:

Vacuum refinery under construction at Paisley.—Equipped with atmospheric and vacuum distillation units; will have daily capacity of 1,300 bbl.; principal products will be lubricating oils; byproducts will include gasoline, diesel fuel oil, and asphalt. Plant superintendent, S. G. Cruikshank, company office, 29 Market Street, Melbourne.

Bitumen Oil & Refining refinery under construction near Sydney.—Refinery to have capacity of 50,000 tons of bitumen annually with resultant quantities of byproducts; proposes to manufacture soft, medium, and hard grades of asphalt required for road construction and for many other uses for which bitumen is required in Australia. Chairman of directors, David Alexander Craig; office, 115 Pitt Street, Sydney.

Commonwealth refinery at Laverton.—Crude capacity approximately 2,857 bbl.; works manager at Laverton, E. W. Sheel; straightrun distillation plant averaging 30 per cent yield of motor fuel; ownership, 51 per cent by the Commonwealth Government, 49 per cent by Anglo-Iranian Oil Co., Ltd.; office, 90 William Street, Melbourne.

Shell refinery at Clyde.—Crude capacity, 6,000 bbl. crude daily; general manager, R. G. Hopkins; works manager at Clyde, W. K. McGavin; principal product, gasoline, with kerosene, fuel oils and special solvents as byproducts. An extension of the existing refinery which will be engaged in the production of asphalt, is expected to be in production by the middle of 1947 and will handle 50,000 long tons of crude annually. Byproducts will be lubricating and diesel oil. Office, Bourke and Williams Streets, Melbourne.

Boyce mentioned that Newport Oil Refinery, Ltd., is engaged on a small scale in the blending of motor oils.

Shale oil in New South Wales, Boyce reported, is produced by National Oil Refineries, Ltd., at Glen Davis, New South Wales, and now results in a refined production of only about 300,000 imperial gallons monthly.

Four Australian Companies Continue Exploration Work

With a party of geophysicists already at work in Australia's Roma district of Queensland, crude-oil development plans are rapidly being formulated by four Australian companies, according to a Reuters dispatch from Sydney.

Names of the companies are: Roma Blocks Oil Co., Kalimna Oil Co., Australian Oil Development Co. and Roma North Oil Co. Failure to drill deep enough reportedly is the reason given for not having previously found commercial oil production in this area.

T.L.L. Output Reported

Trinidad Leaseholds, Ltd., reports that its crude-oil production during March (own fields only) totaled 574,399 bbl. This is a daily average of 18,529 bbl. In January, T.L.L. production was 18,029 bbl. daily.

Officials of the Pacific Coast district, A.P.I. Division of Production, include: Malcolm W. Morris, Los Angeles, Standard Oil Co. of California, district chairman; E. V. Watts, Los Angeles, General Petroleum Co., general chairman; and Charles T. Reichert, Torrance, Calif., National Supply Co., chairman of the general arrangements committee for the spring meeting

Nine Technical Papers on Los Angeles Program

TWO papers of general interest, a banquet speech on world affairs, and nine technical discussions will be presented during the spring meeting of the Pacific Coast district, American Petroleum Institute, Division of Production, scheduled to be held in the Biltmore Hotel, Los Angeles, May 15-16.

The preliminary program follows:

Thursday, May 15

10 a.m.—"True Resistivity Determination From the Electric Log; Its Application to Log Analysis," H. G. Doll, J. C. Legrand, and E. F. Stratton, Schlumberger Well Surveying Corp.; "New Electrical Logging Techniques in California," J. C. Stick, Jr., J. S. Baker, and R. G. Morelius, Lane-Wells Co.

1:30 p.m.—"A General Pressure Volume-Temperature Correlation for Mixtures of California Oils and Greases," M. B. Standing, Standard Oil Co. of California; "Organization Elements: Their Relation to Oil and Gas-Producing Operations," J. E. Toussaint, Standard Oil Co. of California; "A Progressive Public-Relations Program for the Oil Industry," John M. Lovejoy, president, Seaboard Oil Co.; "Evaluation of Well-Completion Effectiveness," F. R. Wade, Union Oil Co. of California.

Evening banquet.—"America's Position in Europe," Manchester Boddy, publisher Los Angeles Daily News.

Friday, May 16

10 a.m.—"Factors Influencing the Selection of Mud Fluid for Completion of Wells," H. E. Bradford, Shell Oil Co., Inc.; "Control of Unconsolidated Sand in the Wilmington Oil Field," Read Winterburn, Union Pacific Railroad Co.

1:30 p.m.—"Recent Developments in Casing Standards and Design," John Wais, Jr., Pittsburgh Steel Co.; "The Determination of Stresses in Oil-Well Casing in Place," C. H. Oberg and R. W. Masters, Standard Oil Co. of California; "Development of Thread-Sealing Lubricants," H. C. Zweifel and L. J. Grunder, Richfield Oil Corp.

Water-Flood Tour Planned

An inspection trip to water-flood operations near Independence, Kans., May 14 has been scheduled by Kansas-Oklahoma water-flood operators as a part of their monthly meeting. The trip will start at the plant of Stekoll Petroleum Co., near Independence, and floods of Felmont Oil Corp. and Layton Oil Co. will be visited. Operations inspected will be discussed at a dinner meeting that evening in Independence.

Exclusive-Dealer Suit Filed Against Richfield

LOS ANGELES.— Charging violation of antitrust laws, the antitrust division of the Department of Justice has filed a civil suit against the Richfield Oil Corp. to restrain alleged illegal marketing practices at 2,600 service stations located in California, Washington, Oregon, Nevada, Arizona, and Idaho.

In a suit similar in type to one filed against Standard Oil Co. of California several months ago, *(The Oil and Gas Journal, January 11, page 39)*, Richfield is accused of requiring the 2,600 dealers to handle exclusively Richfield products and products of certain manufacturers of automotive accessories. This prevents competing manufacturers from marketing their products through Richfield stations, it was charged.

According to William C. Dixon, chief of the West Coast area of the antitrust division, the company owns approximately 1,200 of the service stations, but had leased them to independent operators. The remaining 1,400 are owned independently, it was alleged.

In Washington, Tom C. Clark, U. S. attorney general, said that the suit is one of a series of antitrust actions designed to break up what he termed illegal control by certain oil companies over stations "whereby competition in the retail sale of petroleum products is restrained and independent producers of such products are excluded from access to widespread distributing outlets."

Materials-Requirements Committee Reactivated

Walter S. Hallanan, chairman of the National Petroleum Council, has announced the special committee on materials requirements by the oil and gas industry, headed by Claude P. Parsons, president, Well Protection Co., Inc., Houston, has been reactivated and will be called together in the near future.

Parsons and his committee will meet to ascertain the facts and report to the council on existing steel shortages for casing, line pipe, compressors, refinery equipment, rail and highway-transportation equipment, and other oil-industry equipment and supplies; the probable quantity of deficiencies and the likely duration.

Other members: Frank L. Brinegar, Continental Supply Co., Dallas; H. F. Glair, Standard Oil Co. (Ind.), Chicago; John R. Guynes, Magnolia Petroleum Co., Dallas; Robert S. Hatch, The Texas Co., New York; Harold E. Howard, Howard Supply Co., Inc., Los Angeles; A. J. Kelly, Standard Oil Co. (N. J.), New York; Fred M. Manning, Fred M. Manning, Inc., Denver; William T. Payne, Big Chief Drilling Co., Oklahoma City; Charles T. Reichert, National Supply Co., Torrance, Calif.; J. R. Taylor, Socony-Vacuum Oil Co., Inc., New York; David L. Trax, Gulf Oil Corp., Tulsa; E. H. Weaver, Union Oil Co. of California, Los Angeles; and George W. Young, Standard-Vacuum Co., New York.

West Coast A.I.M.E. Group Schedules Reservoir Talks

LOS ANGELES.—John McMillan, chairman of the Pacific petroleum chapter of the American Institute of Mining and Metallurgical Engineers has announced a series of lectures on reservoir mechanics to be given under the auspices of the production-technology committee. The program was arranged and meetings will be conducted by N. Van Wingnen, national chairman of the committee.

The meetings will be open to all interested engineers and geologists. They will be held in the auditorium of the Ethyl Building, Los Angeles, at 7:00 p.m.

Authors, subjects, and dates follow:

May 26, "Geological and Physical Characteristics of Petroleum Reservoirs," Dean H. Sheldon and Carrol M. Beeson; June 23, "Flow of Fluids in Porous Media," John A. Putnam; July 28, "Thermodynamics of Reservoir Fluids," C. R. Dodson and R. H. Olds; August 25, "Performance of Naturally Occurring Reservoirs," Edmund C. Babson; September 22, "Well-Spacing and Well-Completion Effects," by Richard H. Smith, Russell F. Wade and R. E. Loeck; October 27, "Primary Pressure-Control Methods of Operation," Milan Arthur; November 24, "Secondary-Recovery Methods of Operation," R. H. Zinszer; December 22, "Maximum-Efficient Rate of Production," Harold J. Clark; and January 26, "Evaluation of Oil and Gas Reserves," Carlton Beal.

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Refinery Analysis No.	Crude Capacity BPCD	Gasoline BPCD	Distillate Fuels BPCD	Residual Fuel BPCD	ASTM Octane No.	TEL Ccs/Gal.	Crude Cost ¢/Gal.	By-Product Cost of Gasoline ¢/Gal.	Differential ¢/Gal.	Payout in Years
1	5,000	2,893	1,185	688	83.0	1.9	3.8	4.6	0.8	1.4
2	5,000	2,848	600	1,428	83.5	1.3	3.0	5.0	2.0	2.2
3	5,000	3,281	1,239	286	77.5	1.7	4.2	5.1	0.9	3.5
4	3,000	1,206	870	914	79.0	1.3	4.6	4.9	0.3	2.3
5	6,000	3,673	1,080	1,036	77.5	0.7	3.2	4.2	1.0	3.7
6	4,000	2,842	320	604	79.0	0.7	3.2	4.7	1.5	3.6
7	6,000	3,992	.....	1,566	82.5	0.9	3.0	5.1	2.1	2.9
8	4,000	2,610	400	753	78.0	0.5	3.1	4.6	1.5	2.9
9	12,000	7,787	1,800	1,602	81.0	1.5	2.8	4.0	1.2	1.1
10	5,330	3,812	.....	1,032	80.5	0.5	2.9	4.5	1.6	3.3
11	22,500	15,562	2,250	3,004	80.0	0.6	3.9	5.1	1.2	2.3
12	12,000	5,969	1,025	4,612	82.0	1.1	2.5	3.6	1.1	2.5
13	10,000	5,110	3,963	574	78.0	0.5	3.5	3.9	0.4	1.8
14	3,500	1,764	525	1,069	80.0	1.1	3.1	4.7	1.6	2.2
15	9,000	4,663	2,375	1,662	76.0	0.6	4.6	5.1	0.5	2.2
16	6,750	4,473	1,991	783	81.5	1.5	3.9	4.7	0.8	1.7

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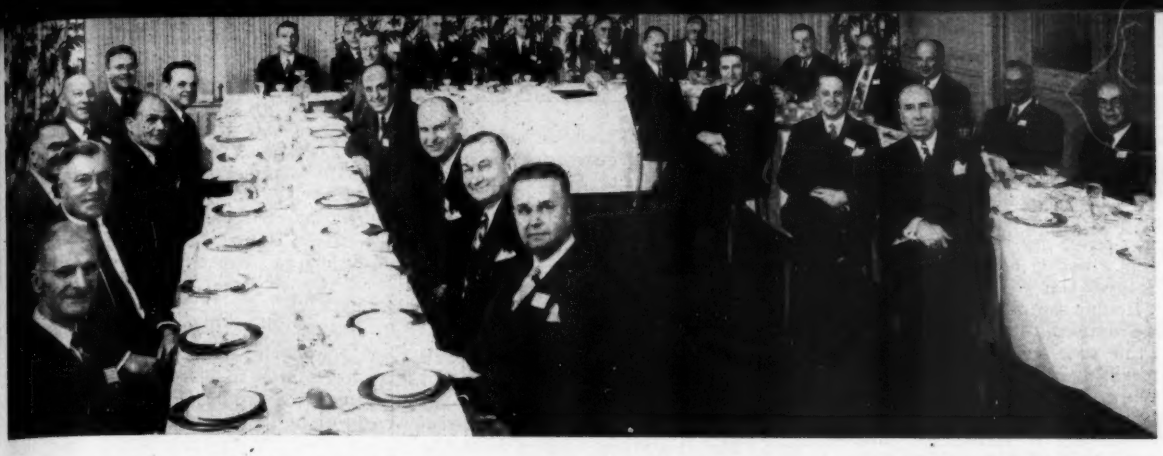

Managing and Advisory Committee, Natural Gas Department, American Gas Association, at annual spring meeting, April 30-May 1. Left to right around the outside: George A. McDonald, A.G.A.; J. D. Creveling, consultant; Hiram M. Dow, Interstate Oil Compact Commission; H. R. Bennett, Union Producing Co.; E. P. Noppel, Ebasco Services, Inc.; E. L. Rawlins, Union Producing Co.; William Ferguson, Bureau of Mines; John W. West, Jr., A.G.A.; H. Carl Woll, managing director, A.G.A.; J. French Robinson, East Ohio Gas Co.; Robert W. Hendee, Colorado Interstate Gas Co., and chairman of Natural Gas Department, A.G.A.; H. D. Hancock, Gas Advisers, Inc.; George H. Smith, director of Natural Gas Department, A.G.A.; Frank H. Lerch, Jr., Consolidated Natural Gas Co.; Arthur F. Bridge, Southern Counties Gas Co.; H. J. Carson, Northern Natural Gas Co.; Elmer F. Schmidt, Lone Star Gas Co.; and Prof. C. M. Young, University of Kansas. Left to right around the inside: C. H. Zachry, Southern Union Gas Co.; Edward Buddrus, Panhandle Eastern Gas Co.; A. H. Weyland, Arkansas-Louisiana Gas Co.; E. G. Dahlgren, Interstate Oil Compact Commission; F. W. Peters, Oklahoma Natural Gas Co.; F. A. Hough, Southern Counties Gas Co.; E. S. Pettyjohn, director, Institute of Gas Technology; Irving K. Peck, Manufacturers Light & Heat Co.; Maj. T. J. Strickler, Gas Service Co.

Continued Growth of Gas Industry Indicated, A. G. A. Group Told

by C. O. Willson

CHICAGO.—Producers, transporters, and distributors, meeting here April 30-May 1 at the annual spring meeting of the Natural Gas Department of the American Gas Association, were told that consumer demands since the ending of World War II point to rapidly expanding markets for natural gas over a period of several years. The 2-day meeting revealed that never in the history of the natural-gas industry has there been a period comparable to the growth in transmission and distributing facilities assured for the remainder of this year and 1948.

It was pointed out that the operating position of the natural-gas industry has changed from what it was prewar. A decade ago the primary concern of a company proposing to build a new system or enlarging an an existing one was to find enough new customers to justify the required capital expenditures. Now the main problem is to obtain federal authorization and equipment and materials to lay the lines for whose output there is a ready demand wherever natural gas is made available.

No long-range projections of future demands for natural gas were made at the meeting, although it was emphasized that the expansion in recoverable reserves continues greater than the increase in consumption with underground supplies as of the first of the year approximately 160 trillion cubic feet. Present reserves and additions to come, it was pointed out, assure old and new customers the benefits of natural-gas fuel for an indefinite period.

Markets

Irving K. Keck, vice president of Manufacturers Light & Heat Co. indicated the growth to be expected in the near future in the household heating load. Based on central heating, he said the present saturation in Northwest United States is 3½ per cent with 7 to 10 per cent in prospect as the gas is made available. In North-Central United States the present saturation is 16 per cent with 50 to 60 per cent expected. In the Middle West the saturation is 4 to 10 per cent with 20 to 50 per cent in prospect. In the Southwest where gas is used for all types of heating a steady expansion is assured.

Peck and others during the meeting pointed out that the increase in household heating may pose operating problems for transmission and distributing companies. In some cases it will tend to reduce the quantity of gas available for industry which constitutes largest outlet for most systems. The industrial outlet has the advantage of being not only large but uniform throughout the year while there are wide seasonal variations in household heating outlets.

Hendee Presides

Robert W. Hendee, president of Colorado Interstate Gas Co. and chairman of the Natural Gas Department, presided at the general sessions, and H. J. Carson, vice president of Northern Natural Gas Co. and chairman of the transmission committee of the department, presided at two transmission meetings. F. W. Peters, secretary-treasurer, Oklahoma Natural Gas Co. was in charge of an open round-table conference devoted to problems dealing with depletion accounting, tax reports, job-training problems, and other matters having to do with office work.

30-In. Pipe Line

Considerable interest was manifested in the report of F. A. Hough, executive engineer of Southern Counties Gas Co. which is the operating

company now building a 30-in. pipe line from Blythe to Santa Fe Springs, Calif. This is part of a new system extending from Texas to California and the 30-in. segment is largest diameter line ever built for the transmission of gas. The remainder of the line which is being built by El Paso Natural Gas Co. is 26 in.

Hough said the first gas deliveries are expected to start by November 1 this year and by March 1, 1948, the operating program calls for the delivery of 175,000,000 cu. ft. daily. The ultimate capacity of the line is 305,000,000 cu. ft. daily. An interesting feature of Hough's discussion had to do with the company's decision to use 30-in. pipe. He presented design data showing that the additional size, compared with a 26-in. diameter line with the same compressor capacity, will give the company a net operating storage of 60,000,000 cu. ft. He said that the same storage capacity which will be needed in part for variations in deliveries over a 24-hour period will cost approximately one-fifth what the same storage capacity would cost through use of the conventional type of holders. Hough's discussion, which was illustrated with movies and slides showing the manufacture of the pipe and laying of the lines, will be made available as an association reprint.

Gas Turbines

The paper, "Gas-Turbine-Driven Centrifugal Compressors for Natural-Gas Pipe Lines," by E. T. P. Neubauer, engineer of Allis-Chalmers Co., resulted in considerable discussion by representatives of other manufacturers and transmission comanies. *(This paper was reproduced in the May 3 issue, The Oil and Gas Journal, starting on page 59).* It was explained by Neubauer that the utilization of this type of equipment is in the development stage but his company is confident that it will prove to be an economical method of gas transmission. Several questions were asked by those who are manufacturing and using the conventional type of gas engines and compressors. Others challenged the assumptions of lower capital expenditures and lower operating costs of the gas-turbine-centrifugal-compressor method of operation. It was agreed that a thorough testing of its possibilities is desirable and justified on a basis of developments to date.

Standby Facilities

The large increases in natural-gas demand of the past winter and those assured for the future have added to the importance of standby facilities to aid in supplying peak demands, E. G. Dahlgren, assistant secretary of the Interstate Oil Compact Commission and Hough discussed the present position of underground storage in connection with the operation of natural-gas pipe lines. Dahlgren recently completed a nation-wide survey showing that there are now approximately 70 storage pools in several states. Approximately 50 of these are located in the Appalachian region and are operated in connection with the delivery of gas to eastern markets.

With some information yet to be compiled, Dahlgren estimated that this underground storage has a delivering capacity of 1,500,000,000 cu. ft. of gas per day. He said that the storage areas have contained over 120,000,000,000 cu. ft. at their maximum peak with their maximum practical capacity estimated at 250,000,000,000 cu. ft. He explained that the amount of gas in storage October 31, 1946, was more than 105,000,000,000 cu. ft. and this, due to peak winter requirements, had decreased to 77,500,000,000 cu. ft. in March 1947. Dahlgren quoted from reports showing that the Federal Power Commission favors the use of underground storage in the operation of large interstate gas systems. His report reviewed conditions in each state in which underground storage is being used.

The discussion on steps being taken by Texas to bring about utilization of flare gas which E. O. Thompson, chairman of the Texas Railroad Commission, presented at the A.G.A.'s Natural Gas Department meeting, is reproduced in substantial portion on pages 44 and 45 of this issue.

Five other papers and reports given at the April 30-May 1 meeting in Chicago were included in a special 18-page section beginning on page 58 in The Oil and Gas Journal's issue of May 3. These were:

"Gas-Turbine-Driven Centrifugal Compressors for Natural-Gas Pipe Lines," E. T. P. Neubauer, Allis-Chalmers Manufacturing Co., Milwaukee.

"Report on Pipe-Line Flow," a report of a cooperative study of the American Gas Association and the Bureau of Mines.

"Spotting Pipe-Line Troubles at 100 Miles Per Hour," G. F. Leamon, Leamon Flying Service, Kansas City, Mo.

"Operating Experiences with Angle-Type Compressors," O. H. Moore, Tennessee Gas & Transmission Co., Houston.

"Well-Head Price Fixing," Glenn W. Clark, Cities Service Gas Co., Oklahoma City.

Propane-Air Standby

Al Lauderbaugh, chief engineer of Manufacturers Light & Heat Co., Pittsburgh, gave a detailed report on the use of propane-air installations for standby operations. Exclusive of storage, he said that cost of standby propane-air installations range from $22,000 per 1,000,000 cu. ft. for plants with a capacity of 2,500,000 to 7,000,000 cu. ft. daily to $11,000 per 1,000,000 cu. ft. for capacities of 17,000,000 cu. ft. He said that the cost of a 30,000-gal. capacity storage tank was $11,000. He said it cost $1.11 to $1.24 per 1,000 cu. ft. to deliver the propane-gas mixture to the gas systems.

Lauderbaugh pointed out the desirability of being able to use mixtures of liquefied gas as well as propane in the operation of this type of standby equipment. He said that prices had advanced and with a strong market for motor-fuels, users of butane are competing with refiners and motor-fuel blenders in the use of liquefied gases. He described a plant installation for conversion of propane to propane-air which is largely automatic in its operation.

George R. Benz, Phillips Petroleum Co., Bartlesvile, Okla., said the present demand for liquefied gas totals 1,125,000,000 gal. yearly with most markets rapidly expanding. He said of this total 631,000,000 gal. is for household use and 80,000,000 gal. is used by natural-gas companies in 1946. He said that the trend was toward the greater use of propane. He warned that conditions indicated that demands, due partially to transportation facilities, would exceed supplies over the next 6 to 12 months.

Gas Conservation

E. O. Thompson, chairman, Texas Railroad Commission, and Hiram M. Dow, chairman, Interstate Oil Compact Commission, emphasized the necessity of the natural-gas industry cooperating with the state conservation bodies in the reductions of gas wastage in the fields. Thompson reviewing what had been accomplished in Texas in the reduction of flare gas from wells and from natural-gasoline plants said: "I want to make crystal clear that it is our intention in Texas to see to it that the fruits of conservation shall be given first place in the gas demand picture. I mean that the liquid hydrocarbons extracted from casing-head gas produced with oil must be used by the refiners of our nation, and the Texas Railroad Commission intends to give these liquid hydrocarbons first place in our allocation to meet market demand for petroleum. Then after this gas has been processed and the liquid hydrocarbons removed, we intend to allocate this residue gas to first place in the market for natural gas."

Dow in a plea for greater cooperation on the part of gas industry with the states in the application of conservation regulations pointed out that the recent report of the staff of the Federal Power Commission gave the states and the gas industry 3 years to end gas wastage.

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WASHINGTON WATCHING

BY HENRY D. RALPH

Questionable Economy

WASHINGTON.—The House passed the Interior Department appropriation bill with all the reductions in funds for oil and gas activities recommended by its appropriations committee, in spite of the protests of many western members.

The Senate, which is traditionally more generous with this department than the House, may restore some of the lost funds but there is little expectation that the final measure will come close to the figure recommended by the Budget Bureau.

The Oil and Gas Division, which is entirely eliminated except for a reduced appropriation for enforcement of the Connally act, is already issuing dismissal notices to most of its 40 Washington employes, since the House bill stipulated that accrued annual leave must be paid out of funds available for the current fiscal year. The same thing is being done in other department units which have been cut severely.

The National Petroleum Council authorized Chairman Walter S. Hallanan to make representations to the Senate for continuance of OGD, and he immediately issued a statement declaring that the House committee's report was a misconception of the functions of OGD and NPC and was an attempt to "smear" the petroleum industry and its motives.

Further Delay on Leases

The greatest effect on the oil and gas industry will be a further slowing down in actions on applications to lease public lands. Already some 2 years behind in this work, the Bureau of Land Management has been given a cut of 11 per cent in its Washington force and 37 per cent in its field force. This leasing work is also dependent on the land classification and mineral-leasing activities of the U. S. Geological Survey, which have been cut 49 per cent and 31 per cent, respectively. A new law, transfer of leasing activities from other departments, and greater wildcatting efforts have increased the department's leasing work, and it was attempting to clear up its backlog and decentralize to its field offices.

Research work of the Bureau of Mines has been cut 30 per cent, which will mean abandonment of much of its work on secondary recovery and elimination of a project on diesel and jet-propulsion fuels requested by the military. Its appropriation for petroleum economics and statistics has been cut 37 per cent, which will prevent collection of data on foreign activity and may mean dropping the monthly crude-demand forecast and other statistics used by both Government and industry.

The House committee stated that it was attempting to cut the Interior Department down to its 1938 appropriation. But officials point out that since that time new activities have been added to the department by law and executive order and the government salary scale has been raised, so that the amount in the House bill will allow it to do only half as much as it did in 1938.

In both the hearings and the report of the House appropriations committee there appears frequently the statement that industry should pay for the services it gets from the Interior Department just as the coal industry paid for the work of the old Bituminous Coal Commission. This was the so-called Guffey Act which regulated every activity of the coal industry from mine face to retail sale and taxed the industry to insure compliance. No responsible person would support such a plan for the mineral industries, least of all the present Republican Congress.

While some government research projects are financed in part by industry groups and some government statistical services are sold on a subscription basis, department officials say it would be impossible to arrange for the oil industry to support the department's oil and gas activities on a fee basis. They also insist that all of the department's research and statistical work is of a nature which cannot be done by industry itself.

The greatest misconception of the appropriations committee is that the department exists primarily to serve the mineral industries. Actually, department officials say, its findings are chiefly for the benefit of the Government itself and for the general public.

Preparations to Liquidate

PURSUANT to the mandate of the House of Representatives, the Oil and Gas Division is preparing to close up shop on June 30 and to liquidate the National Petroleum Council on the same date.

In the meantime it will carry on with a skeleton staff in hopes that the various committees of NPC will submit reports before the end of the fiscal year.

OGD has already dismissed 15 of its 38 Washington employes. For the next couple of months the OGD will consist only of Director Max Ball, Robert E. Friedman, counsel, E. B. Swanson, associate director, and Carroll D. Fentress, petroleum technologist, plus about a dozen clerical and administrative assistants.

Administration of the Connally Hot Oil Act is all that is left to OGD after June 30, and the department does not intend to maintain a separate division for this work. Swanson, who has been in charge of this activity since its inception, probably will be transferred to the secretary's office to continue this function. Funds for Connally Act enforcement during the coming fiscal year have been cut drastically, and many field employes will be laid off in the near future.

There is a possibility that the Senate, which has yet to act on the Interior appropriation bill, may restore some funds for OGD, in which case plans will be changed again. But because the House bill decreed that no obligations, not even accrued annual leave, could be carried over into the next fiscal year, OGD was forced to make plans for its complete liquidation without a deficit by June 30.

Meanwhile other bureaus of the Interior Department are announcing severe reductions in personnel and activities in order to conform to the House appropriation bill. Among other things, the Bureau of Mines has announced that it will close its lignite-gasification pilot plant at Grand Forks, N. D., July 1; will curtail by 36 per cent its research into secondary recovery and increased utilization of petroleum, and will skeletonize research requested by the Army and Navy on other liquid fuels.

An FPC Declaration

THE Federal Power Commission shortly will issue an administrative rule stating unequivocally that section 1(b) of the Natural Gas Act does not apply to the arm's-length sale of gas by a producer and gatherer to an interstate transmission pipe line.

This rule is being drafted in conformity with the recommendations of the staff report under the natural-gas investigation, and FPC hopes it will go far to quiet the fears of the oil and gas industry that the commission has the intention of regulating them. The commission also hopes this will make it unnecessary to amend the Natural Gas Act to exclude produc-

tion and gathering more specifically than the law now states.

However, this new rule will not extend the field-price standard of rate-making to gas produced by pipe line companies or their affiliates. The commission feels that this is a highly complicated and important question, involving the rights of competing independent gas producers as well as transmission companies and their customers. This will be dealt with in detail in a forthcoming section of the staff report, which will be circulated for general comment before becoming official FPC policy.

No Compromise

WITHIN the next 6 or 8 weeks the Federal Power Commission expects to complete all the remaining chapters of the staff report under the natural-gas investigation, probably seven more volumes in all.

In each case the commission will ask all interested parties to submit pertinent comments within a reasonable time, probably 60 days. Following this the commission itself will digest all the staff reports and comments and combine them into its final report, which it expects to have completed by early fall.

Incidentally, the commission is rather disappointed at the failure of the gas industry to make constructive comments on the staff reports it has issued to date. The first of these, issued January 17, dealt with the "service area" provision of the act and suggested a way whereby gas companies could expand their facilities to a limited extent without the necessity of obtaining certificates from FPC. A few natural-gas companies submitted their reactions and some constructive suggestions were made, but most of the industry was content to rest on a statement filed jointly by the Independent Natural Gas Association, Independent Petroleum Association, and American Petroleum Institute.

The commission feels a bit hurt over this. It takes the position that it offered its hand in cooperation but the gas industry refused it and instead socked it with the Rizley, et al, bills for drastic revision of the law.

Sidetrack Delays

A COUPLE of side issues have delayed resumption of the probe of the Navy's purchase contract with Arabian American Oil Co., and it now appears that further hearings will not be held for several weeks.

The burning issue at the moment—at least the one that burns up the Senate war investigating committee—is the sancity of the official papers of the late President Roosevelt. Most of these papers are in the physical possession of the executors of the estate, being sorted over preparatory to deposit in the Roosevelt Memorial Library in Hyde Park, N. Y. The committee has reason to suspect that these files contain references to the 1941 proposal from the company that it sell Arabian oil to the Navy at a price lower than it charged in a subsequent contract.

The committee asked President Truman to let one of their investigators comb the files. He declined, but asked the custodians to make such a search and send anything they find to the White House. So far all that has been produced is a copy—but not the original—of a letter to the President from James A. Moffett, dated April 16, 1941. Moffett had already given the committee a copy of this letter when he testified in support of his charges that Aramco is making excessive profits out of its oil sales to the Navy.

So the committee has called the executors of the estate and the custodians of the library to come down and talk this over. The committee thinks there must be more dope in the files, that maybe somebody is trying to cover up something, and that its own investigators have the right to take a look.

Then there is another side issue involving the right of the committee to hire former Senator Burton K. Wheeler as its chief investigator in the Arabian matter. Wheeler is already at work but he wants a special law to permit him to keep his private law practice while on the committee's payroll. Congress obliged, but President Truman vetoed it on the ground that its language might be interpreted to permit Wheeler to file suits in the name of the Government. So a revised bill must be put through before Wheeler is free to do his stuff.

Meanwhile the company and its parents, The Texas Co. and Standard Oil Co. of California, are preparing their defense but keeping mum on advice of counsel. The only thing they have done to date is to release to the press photostatic copies of letters Moffett wrote in February 1946 to the Saudi Arabian Embassy asking that Aramco's concession be expropriated and turned over to Moffett.

Oil-Shale Plant Will Be Dedicated May 17

The Bureau of Mines' $2,000,000 experimental oil-shale plant at Rifle, Colo., will be dedicated at ceremonies there Saturday, May 17.

Speakers will include Oscar L. Chapman, undersecretary, Department of the Interior; R. L. Rockwell, Colorado congressman; Commodore William G. Greenman, director of naval petroleum reserves; F. C. Merriell, secretary, Colorado River Water Conservation District; and R. R. Sayers, director, Bureau of Mines. Sen. Joseph C. O'Mahoney and A. R. Olpin, president, University of Utah, will speak at a banquet following the dedication and an afternoon inspection tour of the plant and mine.

Annual P.E.S.A. Meeting Opens in San Francisco

SAN FRANCISCO.—Approximately 200 oil-equipment manufacturers and supply-company officials from all parts of the United States met at the Mark Hopkins Hotel, San Francisco, May 4-7, for the annual meeting of the Petroleum Equipment Suppliers Association.

Hugh H. Glen, P.E.S.A. president and head of Emsco Derrick & Equipment Co., welcomed the delegates to San Francisco, expressed hope for future accomplishment of the association and then appointed a finance committee composed of Chairman Rodney S. Durkee, Lane-Wells Co. president, W. M. Bovaird, Bovaird Supply Co., Ardon B. Judd, Republic Supply Co., Ted Sutter, Baker Oil Tools, and A. W. McKinney, of National Supply Co.

H. R. Safford, Jr., association executive secretary, after reviewing the work to date of the sales-accounting committee, turned the meeting over to R. D. Hilborn, of Jones & Laughlin Supply Co., who recommended simplification of invoicing involved in the purchases of oil-field supplies. Hilborn stated that more than 75 per cent of the suppliers' billing paper work represents only 6 per cent of his dollar sales volume.

R. M. Morrison, general purchasing agent, The Texas Co., New York, speaking from the oil-company buyers' viewpoint, stressed the need for greater efficiency in oil-equipment merchandising methods and invited the association to submit a concrete proposal to be studied by the forthcoming meeting of the purchasing agents group in New York June 2-4. Monday afternoon was devoted to a consideration of labor-relations problems. The principal speaker, Frank Rehm, Shell Oil Co., Inc., vice president, conducted an open forum on the subject of industrial relations and personnel.

Oklahoma Production Sold

R. L. Robb and associates, Dallas, have bought 16 producing wells on 240 acres of land in Soldier Creek pool, Oklahoma, from W. H. Peckham, Wichita Falls, for a reported cash price of $450,000. Daily production of the wells was reported to be 550 bbl.

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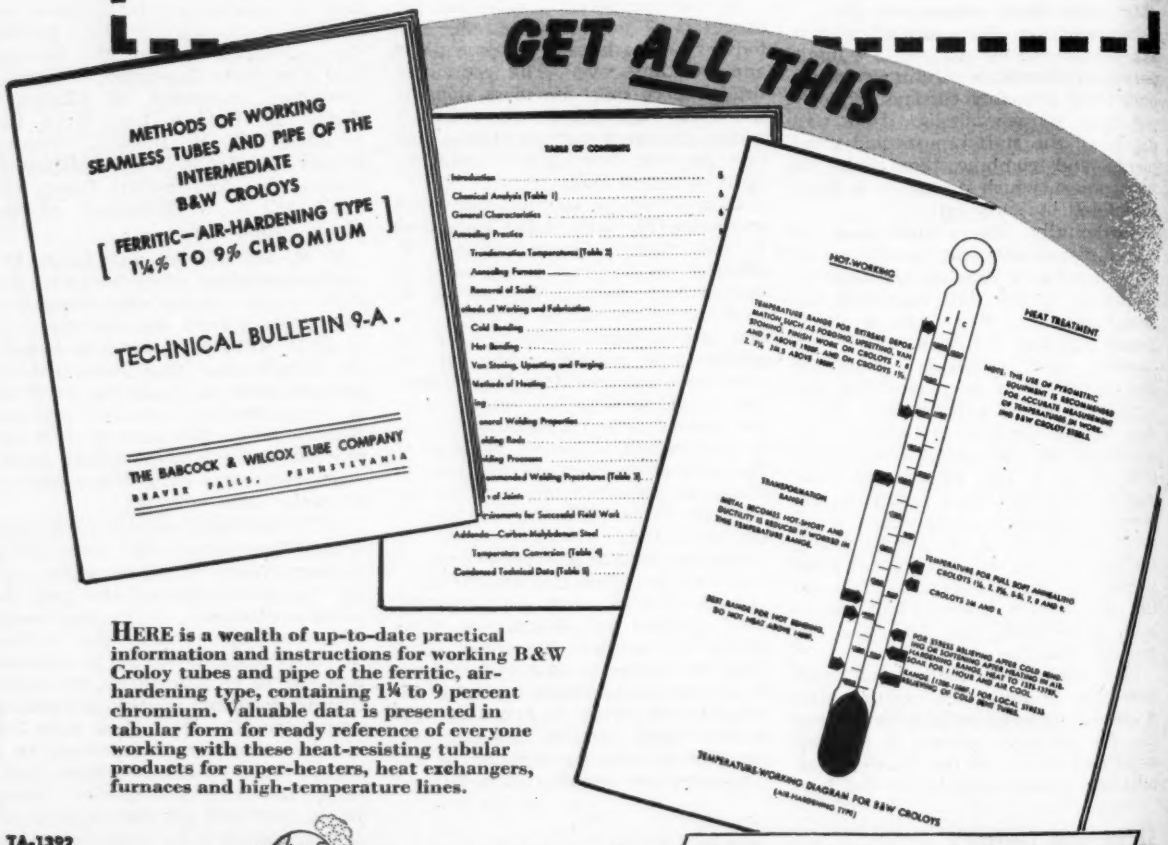

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PERSONALS

Keeler Elected Phillips' Refining Vice President

W. KEELER, Phillips Petroleum Co., was elected by the board of directors, April 29, as vice president in charge of refining to succeed W. G. Hiatt, who died April 12. Of a long line of hardy and prominent Oklahoma pioneers, Keeler has spent 16 years in Phillips' refining department, coming up through the ranks, as a field engineer, then in the gasoline department, then the research department in Bartlesville, Okla.

He was employed part time for several years, alternating work with the company with attendance at Kansas University where he studied mechanical engineering. The rungs on his professional ladder include service as chemist, process engineer, chief chemist, night superintendent, assistant manufacturing superintendent, and chief process engineer.

Outstanding in his more recent experience is a year spent in Mexico as project manager during construction of a refinery at Mexico City for the Mexican Government, for which Phillips had been selected by the U. S. Government as technical supervisor. He served on several technical committees during World War II, including the PAW catalytic-cracking subcommittee.

Keeler comes of a family of cattlemen in the Osage area of Oklahoma. His grandfather, George Keeler, worked out with the Department of Interior plans whereby the first Oklahoma commercial oil well was drilled in Bartlesville in 1897.

J. W. Amyx, assistant engineer, has been assigned to the staff of the petroleum and natural-gas division of the Bureau of Mines in Wichita Falls, Tex.

E. J. Berghausen, junior technologist for Shell Chemical Corp., has been transferred from San Francisco to New York. Five junior chemists in the company's Torrance plant have been promoted to chemist. They are: **L. R. Donkle, L. C. Norton, Dorothy J. Schroeder, J. F. Self,** and **C. V. Samuelson.**

Robert F. Strohecker has returned to the Beacon Laboratories, Beacon, N. Y., of The Texas Co. as a mechanical engineer following termination of an educational leave, during which he received his master's degree from Northwestern University. Two new chemists in the laboratories are **William W. Henoch,** Northwestern University graduate, and **R. W. Mottern,** formerly with Tennessee Eastman Corp.

H. P. Carroll, operating manager, and **E. L. Henderson,** assistant operating manager, United Gas Corp., have been elected vice presidents, according to an announcement by **J. V. Strange,** vice president and general manager.

R. D. Moriarty, manager of materials for Creole Petroleum Corp., is scheduled to return to Caracas, Venezuela, May 15, following a 6-week business trip to Houston, Dallas, Tulsa, Chicago, and New York.

Frank Morgan, vice president of Richfield Oil Corp., Los Angeles, left Sydney, Australia, by air last week for the United States, ending a 3-week visit in Australia.

Charles R. Woodruff, party manager at Casper, Wyo., in the exploration department of Shell Oil Co., Inc., has been promoted to seismologist. **Cloyce S. Gilliland,** surveyor-permitman at Casper, has been named party manager. **Stanley S. Day,** junior geologist, has been transferred from Casper to Grand Junction, Colo.

R. J. De Largey, chief technologist at Houston in the manufacturing department of Shell Chemical Corp., has been transferred to Shell Point as plant superintendent. Other manufacturing department promotions and transfers include: **H. O. Duguid,** from senior engineer in the head office to chief engineer, Houston; **J. I. Schultz,** from senior technologist in the head office to chief technologist, Shell Point; and **H. I. Wolff,** chief technologist, from Shell Point to Houston.

G. L. Stewart has been elected chairman of the board of Imperial Oil, Ltd., to succeed **F. W. Pierce,** who announced his retirement because of other duties. **H. H. Hewetson** was reelected president, and **O. B. Hopkins, J. R. White,** and **K. A. Henderson** were named vice presidents. The board of directors was reelected without change.

Evan Thomas has been named general manager, Cotton Valley Operators Committee, in charge of operations of the unitized field and cycling plant at Cotton Valley, La. Thomas rejoined The Foxboro Co. about a year ago after returning from service in the Navy. He succeeds **T. W. MaGuire,** who resigned last month.

J. K. WRIGHT

J. K. Wright has been elected director of the Mississippi Oil & Gas Engineering committee to succeed **Alec M. Crowell.** Wright, a native of Oklahoma and a petroleum-engineering graduate of the University of Oklahoma, formerly was with Phillips Petroleum Co. and later McAlester Fuel Co. as production engineer. From the inception of the Mississippi committee during the early part of 1945, Wright was chief engineer until the fall of 1946 when he became acting director. Crowell left the organization to join the staff of the Oil and Gas Division of the Department of Interior and recently has become affiliated with Texas Eastern Transmission Corp.

Roy L. Beckelhymer, consulting geologist, has opened offices at 307 Rusk Building, Houston. Beckelhymer has just returned from 4 months in Panama where he did consultant work for Sinclair Refining Co.

Maurice M. Luther, Fort Worth, has been elected a director and comptroller of Standard Crude Oil Purchasing Co.

Bradley Murray is leaving the Oil and Gas Division of the Interior Department May 15 to join the International Bechtel Corp. in Saudi Arabia. He will spend a few days at his home in Tulsa and then visit the company's offices in San Francisco before leaving for the Middle East.

PERSONALS

H. G. DENHAM

H. G. Denham, formerly manager of sales for Arabian American Oil Co., has been appointed special assistant to **William A. Pinckard,** president of California Texas Oil Co., Ltd. Both companies are jointly owned by The Texas Co. and Standard Oil Co. of California. Denham spent 11 years in China for Socony-Vacuum Oil Co., Inc., later joining California Standard and became assistant manager of the foreign-trade department in 1939. For a year he was president of the California Commercial Co., a California Standard service company.

Glen M. Foster has been elected secretary of Standard Oil Co. of California to succeed **B. W. Letcher,** who will now devote his entire time to his duties as a vice president.

O. H. Beshell has been named superintendent of the western division of Magnolia Pipe Line Co. with headquarters at Midland, Tex. **M. L. Butler** will be chief division clerk. **F. G. White,** district superintendent of the North Basin district, is moving his headquarters to Brownfield, Tex. The changes, effective May 1, were made in a revision of the company's operating divisions and districts.

Paul B. Fahle will be in charge of Plymouth Oil Co.'s district office, recently moved to Shreveport, La., from El Dorado, Ark. **A. B. Cox, Jr.,** is geological scout and **R. E. Rogers** is land man.

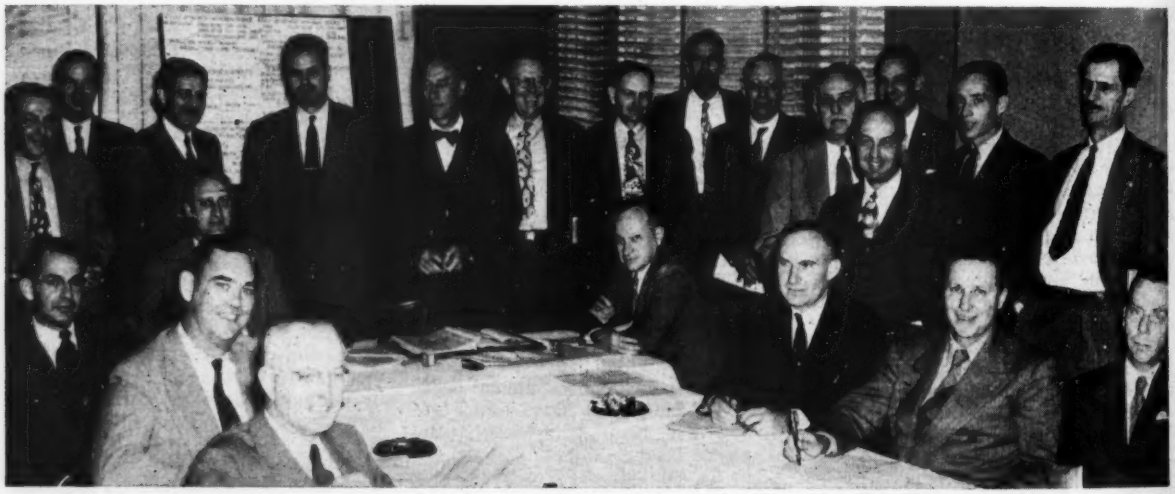
J. Frank Drake, president, headed a group of Gulf Oil Corp. officials and stockholders on an inspection tour of Gulf's coastal properties. The group had visited Fort Worth and made an inspection tour of Gulf properties in West Texas and New Mexico before joining Drake in Houston. Several of the party stopped in Tulsa enroute from the East to Texas. Included in the party were **Alan M. Scaife,** Pittsburgh, and **Donaldson Brown,** New York, directors; **E. C. Bothwell,** Pittsburgh, vice president; **J. F. Walton, Jr.,** Pittsburgh, sales department; **A. Rex Flynn,** president, Booth & Flynn Co., Pittsburgh; **George W. Wyckoff,** Wyckoff Steel Co., Pittsburgh; **J. H. Russell,** vice president, and assistants **Ben C. Belt** and **H. B. Fuqua,** Houston; **N. H. Perry,** vice president, pipe line, Houston; **O. H. Carlisle,** Houston, division sales manager; **Rush Greenslade,** vice president of Gypsy division, Tulsa, and his assistant, **P. H. Bohart;** and **S. G. Sanderson,** superintendent of production, Tulsa.

Dan C. Williams, Jr., has resigned as assistant chief petroleum engineer, Magnolia Petroleum Co., Dallas, to become an independent operator and to do general consulting work. He will maintain offices in Dallas. **Charles H. Hudson,** division petroleum engineer, Oklahoma division, has been named to succeed Williams. **Henry L. Waszkowski, Jr.,** will be in charge of the Oklahoma division with headquarters at Oklahoma City. **Ira B. Stitt, Jr.,** succeeds Waszkowski as petroleum engineer in charge of the Healdton, Okla., district.

Edwin M. Tharp, vice president and general manager of Ohio Fuel Gas Co. since 1932, will resign his position May 1 to become head of a public-relations firm bearing his name.

J. G. Tolpin has been appointed to the newly created position of editor of foreign technical information in the development and patent department of Standard Oil Co. (Ind.) Tolpin formerly was associated with Universal Oil Products Co.

B. C. Craft, petroleum-engineering professor, Louisiana State University, addressed the monthly meeting of the Delta Section, American Institute of Mining and Metallurgical Engineers, New Orleans, on "The Present Status of Petroleum-Engineering Education."



Key men of the exploration and development department, Atlantic Refining Co. met last week at the Southwest division headquarters in Dallas for their annual conference. Shown here are representatives of the geological section: seated clockwise—W. H. Butt, division geologist, Tulsa; B. M. Choate, district geologist, Lake Charles, La.; Van D. Robinson, district geologist, Shreveport; H. H. Trager, district geologist, Wichita, Kans.; R. N. Kolm, district geologist, San Antonio; H. V. Tygrett, research geologist, Dallas; W. H. Schluneger, district geologist, Tulsa; W. H. Curry, district geologist, Casper, Wyo.; standing—R. A. Brant, research geologist, Tulsa; H. J. Morgan, research geologist, Dallas; Edgar Kraus, head of the geological section, Dallas; S. L. Smith, assistant to the regional geologist, Dallas; S. R. Bumann, administrative assistant, geological section; L. S. Winter, land man, Lake Charles; A. M. Meyer, district geologist, Shawnee, Okla.; George Norton, research geologist, Dallas; N. B. Winter, district geologist, Midland, Tex.; K. K. Spooner, district geologist, Jackson, Miss.; W. B. Moore, regional geologist, Dallas; Owen B. Wood, district geologist, Houston; W. F. Cooke, Jr., research geologist, Houston; and P. S. Schoeneck, district geologist, Tyler, Tex.

Paul L. Gaurin has been appointed chief mechanical engineer of the regional staff of Shell Oil Co., Inc.,

P. L. GAURIN

L. O'DONNELL

in Houston. He succeeds **Lawrence O'Donnell** who is resigning from Shell in order to devote full time to his private interests. Guarin is a mechanical-engineering graduate of Pennsylvania State College and has been with Shell 21 years. During the war, he was assigned to the Manhattan District, Army Corps of Engineers, which handled the atomic-bomb development. Following his return to the company and until his recent appointment, Guarin served as special assistant to the vice president.

H. M. Staggs, Atlantic Refining Co., Dallas, has resigned as manager of the engineering and operating department to become a drilling contractor in West Texas. **John Marston,** assistant manager of the land department, assumes some of Staggs' duties as operations manager, with supervision over drilling and exploration. Marston has been with Atlantic since 1922.

Dr. John J. Grebe, director of Dow Chemical Co.'s physical-research laboratory, has received a gold medal and $1,000, and **Robert R. Dreisbach,** of Dow's physical-research laboratory staff, a silver medal, from the Hyatt Award Committee for achievements in the plastic field. Dreisbach's award was given for his contribution to the development of styrene.

Stuart G. Branyan, senior petroleum engineer with Carter Oil Co., has been transferred from Seminole, Okla., to Great Bend, Kans. Other recent transfers in the Carter organization: **Robert L. Brock,** gravity-meter engineer, Meridian, Miss., to Jonesville, La.; **Robert M. Disch,** gravity-meter engineer, to Jonesville, La.; **Sidney F. Goree,** acting party chief, gravity meter, Meridian, Miss., to Magnolia, Ark.; **Billy D. Low,** party chief, Magnolia, Ark., to Jonesville, La.; **Frank B. Meek,** junior geophysicist, Tulsa laboratory, to Venezuela as gravity-meter engineer; **Harold S. Miller,** assistant gravity-meter operator, Tulsa laboratory to Greenville, Miss.; **David C. Newell,** gravity-meter operator, Meridian, Miss., to Jonesville, La.; **Willard G. Schmidt,** seismograph operator, Greenville, Miss., to Tulsa geophysical laboratory; and **Dewitt T. Tarlton, Jr.,** gravity-meter computer, Tulsa laboratory, to Venezuela.

Donald F. McMahon, Devonian Oil Co., has been transferred from Tulsa to Midland, Tex., where he will do land and scouting work in West Texas and New Mexico.

F. W. Woodrich, Geophysical Service, Inc.; **J. D. Brown,** General American Oil Co. of Texas, and **R. G. Williams,** Seaboard Oil Co. of Delaware, have been elected directors of the Purchasing Agents Association of Dallas. Other officers chosen at a recent meeting include **Ira Jared,** Sun Oil Co., who was named secretary.

Shifts

J. H. Brewer, foreman, Magnolia Petroleum Co., Vanderbilt to Freer, Tex.; **J. W. Baucum,** superintendent, Humble Oil & Refining Co., Center to Overton, Tex.; **A. M. McLachlin,** engineer, Shell Oil Co., Inc., Premont, Tex., to Houston; **E. R. Woolfolk,** geologist, Stanolind Oil & Gas Co., Sweetwater, Tex., to Albuquerque; **Peter F. Forness,** engineer, Stanolind Oil & Gas Co., Brownfield to Sundown, Tex.

William E. Richards, engineer, Humble Oil & Refining Co., Corpus Christi to Raymondville, Tex.; **V. C. Latch,** superintendent, Signal Oil & Gas Co., Cisco, Tex., to Sunset Beach, Calif.; **Fred L. Nabors,** engineer, Stanolind Oil & Gas Co., Greggton to Brownfield, Tex.; **N. C. Simpson,** engineer, Gulf Oil Corp., Odessa to Fort Worth; **Harold C. Worley,** foreman, Stanolind Oil & Gas Co., Pampa to Levelland, Tex.; **A. E. Woerheide, Jr.,** engineer, Shell Oil Co., Inc., Wichita Falls, Tex., to Wichita, Kans.

F. G. Prutzman, engineer, Sun Oil Co., Delhi, La., to Jackson, Miss.; **R. M. Squires,** engineer, Magnolia Petroleum Co., Oakdale, La., to Dallas; **M. J. Millet,** foreman, The Texas Co., Vinton, La., to Opelousas, La.; **B. F. Burke,** engineer, Carter Oil Co., Shreveport to Magnolia, Ark.; **L. G. Pope,** geologist, Carter Oil Co., Carmi to Mattoon, Ill.; **Lester J. Ringenberg,** geologist, Carter Oil Co., Carmi, Ill., to Pentwater, Mich.; **Franklin E. Eck,** engineer, Carter Oil Co., St. Elmo, Ill., to Tulsa.

E. A. Enloe, engineer, The Texas Co., Joliet to Lawrenceville, Ill.; **M. E. Austin,** engineer, Sun Oil Co., Laurel to Brookhaven, Miss.; **C. R. Summers, Jr.,** superintendent, Gulf Oil Corp., Toledo, Ohio, to LaFayette, Ala.; **K. G. Kugler,** engineer, Standard Oil Co. (Ind.), Cleveland, Ohio, to Tulsa; **George M. Kirkwood,** superintendent, Pennsylvania Refining Co., Karns City, Pa., to Ashland, Ky.

Dale F. Kiester, engineer, Sun Oil Co., Ridley Park, Pa., to Ligonier, Ind.; **Ralph J. Olson,** superintendent, Olson Drilling Co., Stroud to Shawnee, Okla.; **E. W. Steffenhagen,** engineer, Shell Oil Co., Inc., Healdton, Okla., to Tulsa; **W. V. Linde,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Midland, Tex.; **Charles R. Blomberg,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to New Orleans; **C. M. Ross,** geologist, Amerada Petroleum Corp., Duncan, Okla., to Roosevelt, Utah; **T. B. Whitson,** superintendent, Helmerich & Payne, Inc., Oklahoma City to Marlow, Okla.

DEATHS

John T. Brock, 48, sales manager for Greenhead Bit & Supply Co., Oklahoma City, for 15 years, died recently.

Guy Fay, 63, who retired from the sales department of The Texas Co. last year after 35 years of service, died May 1 at his home in Tulsa.

Robert S. Pringle, 74, independent oil producer and founder of Pringle Powder Co., died April 29 at his home in Bradford, Pa.

J. H. Bovaird, 77, Bradford, Pa., one of the founders of Bovaird Supply Co. and Bovaird & Seyfang Co., and a vice president and director of Kendall Refining Co., Bradford, died May 1 in a Baltimore, Md., hospital.

Harry C. Deems, 69, retired drilling contractor and independent producer, died May 1 at his home in Tulsa.

Harvie Brooks, 49, Henderson, Tex., oil operator, died May 2 in an automobile accident near Pirtlet, Tex.

Perry L. Speaker, 65, cable-tool driller, died April 29 at his home in Shawnee, Okla.

Edward A. Duffy, 60, depot foreman of the Newtown Creek, N. Y., plant of Shell Oil Co., Inc., for the past 15 years, died recently.

Specially Designed Workover Barges

Meet Multiplicity Of Operational Requirements

by E. H. Short, Jr.

View at top shows typical Texas Co. workover barge, now operating in Lake Pelto and Caillou Island areas, south of Houma, La. All construction work, design, and changes necessary to convert pumping barges to workover barges were handled by the company's Houma district personnel and construction facilities. The sketch below shows arrangement of barges, designed by R. B. Edmonson

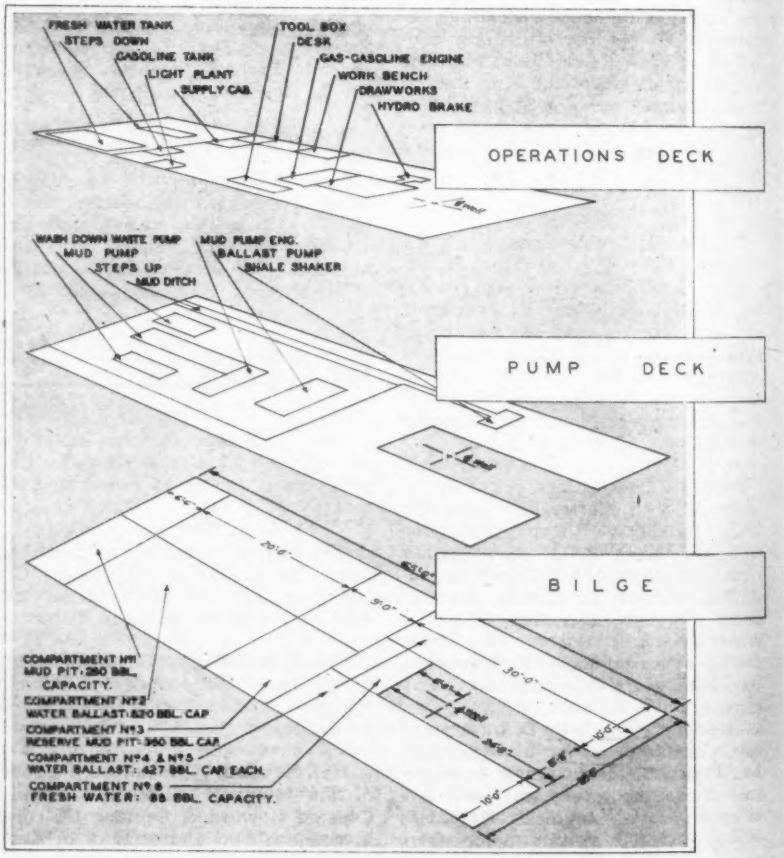
ALL-PURPOSE workover barges, specially designed to obtain a greater over-all efficiency in workover operations, are being used by The Texas Co. in the canal and inland bay area south of Houma, La.

These barges handle work involving: the fishing out and resetting of liners, squeezing, plugging back, recompletion, and the placing of wells on artificial lift, with subsequent servicing operations. In addition to this, and of considerable economic significance, these barges are now being used by the company to complete wells; thereby releasing the drilling rigs for actual drilling operations. This represents a saving in time for a drilling rig, which in some cases might be as much as 2 weeks.

Special Well-Completion Platforms

In conjunction with the design of the workover barges, special well-completion platforms were designed which could be threaded into the slot of the barge. There are three types of platforms. One type is used for flowing and gas-lift wells; a second type for permanent 20-hp. pumping units; and the third is for permanent 40-hp. pumping units. The usual derrick for pumping installations was, of course, eliminated when the present barges were placed into operation.

The Texas Co. workover barges, which, before refitting, were pumping barges, have an 8-ft. all-welded steel superstructure, and are 66 ft. long, 28 ft. wide, and draw 8 ft. At one end of the barge is an 8-by-26-ft. slot. The



derrick is directly above this portion of the barge.

The major items of drilling equipment on the barge include the following:

1. Derrick—94 ft.

2. Draw works—double drum—rated at 6,000 ft. with 4¼-in. drill pipe. A. Engine—8-6¾ by 7-in. cylinder—gas-gasoline.

3. Pumps:

A. 7½ by 14-in. power pump; (a) Engine—6-6½ by 7¼-in. cylinder, gas-gasoline.

B. 4 by 6-in. power pump; (a) Engine—10 hp. single-cylinder, gas-gasoline.

C. 6-in. suction, 6-in. discharge self-priming centrifugal; (a) Engine—4-4 by 4-in. cylinder, gas-gasoline.

4. Light plant—5 kw. d.c.

5. Vibrating mud screen.

The double-drum draw works was selected for this barge to accommodate both drilling and bailing lines. In addition, this unit has six forward speeds and two reverse speeds, vacuumatic controls, and all friction clutches. It is also equipped with a 36-in. hydromatic brake and throwout clutch. The transmission is rated at 500 hp. and the chain drive is entirely enclosed in an oil bath. According to company engineers, the friction clutches are well suited for this particular type of operation, inasmuch as they are faster than the jar-clutch-operated unit. This unit has sufficient power in low to handle 15,000 ft. of 2½-in. 6.5-lb. tubing or drill pipe.

The most recently completed Texas Co. workover barge placed in operation is now at Caillou Island. This barge is 90 ft. long by 40 ft. wide by 8 ft. deep, and is equipped with a 122 by 24-ft. derrick, and gas-gasoline engines. This workover barge has both a conventional pipe rack and the suspended pipe rack. The conventional rack is used when the barge is engaged in working over a well with just a drilling-barge slip. The suspended rack is used when work is being done on a well equipped with either a permanent foundation or well cribbing.

By equipping this barge with a larger engine the hoisting speed with the 122-ft. derrick is comparable to that of the small engines with the 94-ft. derricks. Table 1 is a comparison of performance between the V-12 on the large workover barge and the V-8 engine used on the smaller barge.

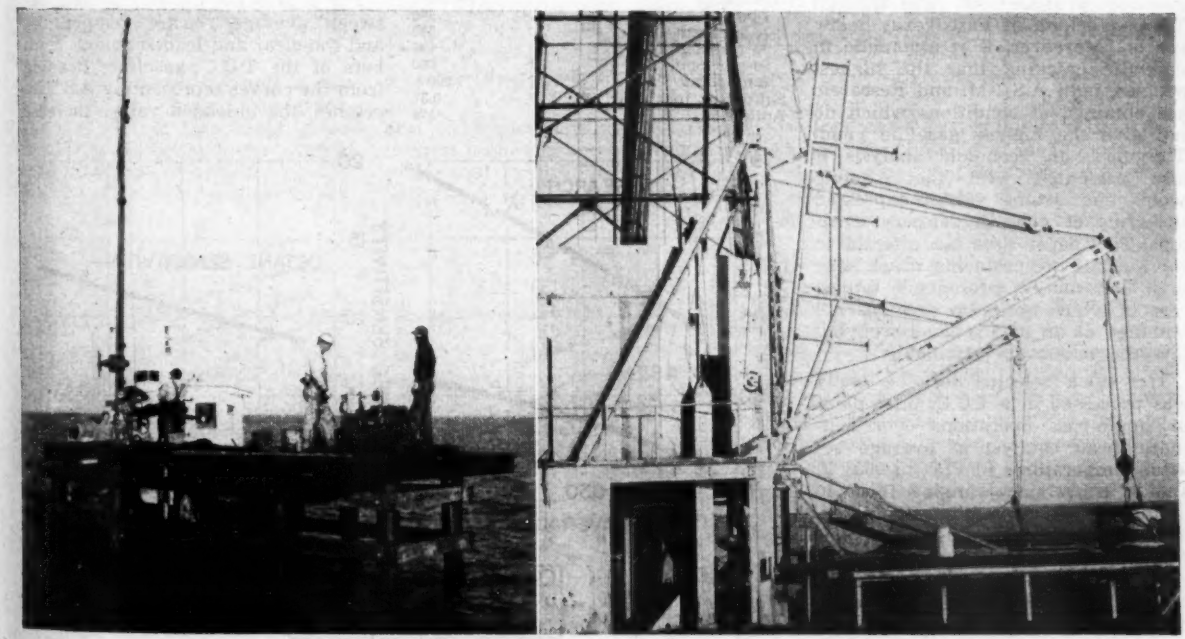
Most of the Texas Co. wells in this area are from 10,000 to 11,250 ft. in depth and it will be noted (from the comparison in Table 1) that with six lines the hoisting time, in case of both motors, is almost identical—as indicated by the asterisks. The installa-

(Continued on page 83)

TABLE 1—SINGLE LINE PULL IN POUNDS

Speed—	With V-8 LeRoi		With V-12 LeRoi	
	6-Line string	8-Line string	6-Line string	8-Line string
1-LL	34,700	32,150	51,600	47,800
2-LL	20,800	19,250	31,100	28,800
3-3L	12,330	11,420	18,440	17,070
4-LH	8,330	6,420	12,430	11,500
5-2H	5,020	3,905	7,500	6,945
6-HH	2,990	2,327	4,470	4,140
(Feet of 6.50-lb. tubing will handle with 10,000-lb. block load)				
1-LL	30,730	38,400	46,300	57,600
2-2L	17,880	22,500	27,400	34,200
3-3L	*11,250	12,850	15,700	19,800
4-LH	6,400	8,300	*10,170	12,960
5-2H	3,335	4,495	5,640	7,340
6-HH	1,470	2,213	2,830	3,907

Speed—	Line speeds in ft. per minute	Minutes hoisting time in Doubles w/V-8		Minutes hoisting time in Trebles w/V-12	
		6-Line string	8-Line string	6-Line string	8-Line string
1-LL	158.5	2.270	3.030	3.310	4.540
2-2L	263	1.370	1.825	2.026	2.740
3-3L	443	*0.815	1.085	1.220	1.625
4-LH	656.5	0.549	0.732	*0.822	1.100
5-2H	1,090	0.330	0.441	0.495	0.662
6-HH	1,828	0.197	0.263	0.295	0.395



Left: Special well-completion platform which can be threaded into slot of workover barge. Right: Suspended pipe rack, a unique feature of the Texas Co. workover barges

Effect of Temperature In Thermofor Catalytic Cracking

*by H. D. Noll,**
R. E. Bland and G. Kelso**

IN view of the present-day high-octane values and the higher ratings which are being forecast, the use of catalytic cracking in order to meet competition becomes a necessity. In addition to meeting competition on quality alone, the installation of catalytic-cracking equipment permits the refiner to obtain the maximum over-all gasoline yield and flexibility.

The basic factors which influence the octane values of catalytic gasolines are reaction temperatures, characteristics of charging stock, and type of catalyst. Thus, for a given charging stock and a given catalyst the reaction temperature is the significant operating variable affecting octane values and sensitivity. Because of its importance, the data presented here are confined to the study of the effect of reaction temperature on the yields and octane ratings, both A.S.T.M. and Research, of catalytic gasoline produced in once-through T.C.C. cracking of East Texas heavy gas oil. Moreover, it is axiomatic in catalytic cracking that the highest octanes, both A.S.T.M. and Research, are obtained at conditions which do not give the highest gasoline yield. Therefore, an economic analysis is also presented with the gasoline yields and octane values expressed in terms of over-all refinery earnings. This paper does not attempt to solve all of the problems which may arise but merely presents a typical case in which optimum earnings are obtained at an octane level well below the maximum attainable.

The stock selected for the study was processed in a T.C.C. pilot plant in single-pass operations over synthetic bead catalyst at average reactor temperatures of 775° to 960° F. and at conversions ranging from 40 to 70 per cent by volume. Characteristics of the stock, a heavy gas oil fraction, derived from East Texas crude, are given in Table 1. Table 2 summarizes the data which form the basis for the graphs and study.

*Houdry Process Corp., New York City.
A paper presented at National Petroleum Association meeting, Cleveland, April 17-18.

Effect of average reactor temperature on the clear A.S.T.M. and Research octanes as well as its effect on octane sensitivity, are shown in Fig. 1. The graph shows that an increase in average reactor temperature from 850° F. to 950° F. increases the A.S.T.M. octane value from 78.2 to 80.8, and by Research, from 88.9 to 94.0.

As shown by the same data an increase in octane sensitivity was also obtained by increasing the average reactor temperature, the spread between A.S.T.M. and Research octanes being 10.7 numbers at 850° F. and 13.2 numbers at 950° F. The increase in sensitivity is due to the fact that Research octanes are influenced more by temperature than A.S.T.M. octanes.

TABLE 1—CRUDE SOURCE—EAST TEXAS

Fraction of crude—56-88 per cent by volume	
°A.P.I.	28.5
Distillation	Vacuum
I.b.p., °F.	440
10 per cent	579
50 per cent	736
90 per cent	909
End point	1,000+
Sulfur, wt. per cent	0.37
Aniline pt., °F.	178

The curves were constructed from operations conducted at space velocities which varied between 0.5 and 2.0 and at volumetric conversions ranging from 40 to 70 per cent. Despite these wide variations, the fact that the octane values correlate exceptionally well with reaction temperature emphasizes that temperature is the dominating factor affecting octane values.

Fig. 2 presents the relationship between average reactor temperature and the clear and leaded octane numbers of the T.C.C. gasoline. Reading from the curves representing A.S.T.M. octanes, the unleaded values increase

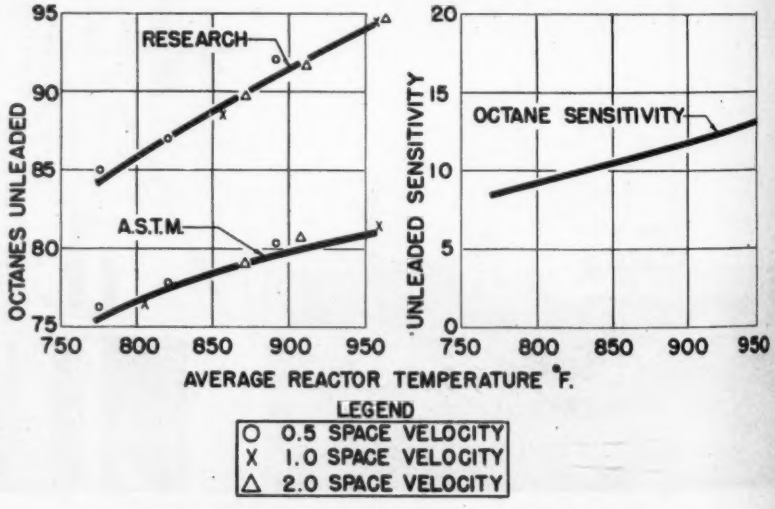


Fig. 1—Effect of average reactor temperature on A.S.T.M. and Research octanes, T.C.C. cracking, heavy East Texas gas oil

TABLE 2—SUMMARY OF BASIC DATA, ONCE-THROUGH T.C.C. CRACKING EAST TEXAS HEAVY GAS OIL

Operating conditions:										
Space velocity—V./hr./V.	0.52	0.51	0.50	1.0	0.98	0.99	0.97	1.98	1.99	2.04
Average reactor temp., °F.	775	820	890	805	870	885	955	870	905	906
Average reactor pressure, psig.	10	10	10	10	10	10	10	10	10	10
Process steam, wt. % charge	13.9	9.5	9.4	13.9	10.1	9.8	9.6	9.6	9.7	9.5
Conversion* (100—Vol. % total catalytic gas oil)	43.1	52.9	67.7	40.8	53.5	56.6	70.2	43.1	47.8	59.3
Yields, % on fresh feed:										
Debutanized motor gasoline, vol. %	36.2	42.2	41.5	35.0	39.7	41.5	39.8	34.9	35.6	36.6
Total B-B, vol. %	7.9	9.4	15.9	7.1	10.2	12.7	14.1	9.3	10.9	15.1
Light catalytic gas oil, vol. %	29.9	....	20.6	29.2	25.6	....	19.0	27.2	....	....
Heavy catalytic gas oil, vol. %	27.0	....	11.7	30.0	20.9	....	10.8	29.7	....	....
Liquid recovery, C_4 plus, vol. %	101.0	98.7	89.7	101.3	96.4	97.6	83.7	101.1	98.7	92.4
Dry gas, C_2 and lighter, wt. %	3.1	5.4	13.0	2.3	7.5	6.8	17.8	4.0	6.2	12.0
Motor gasoline, 10-lb. R.v.p., vol. %	39.1	45.1	43.7	37.6	42.8	44.5	42.2	37.4	37.9	39.0
Excess B-B, vol. %	5.0	6.5	13.7	4.5	7.1	9.7	11.7	6.8	7.6	12.7
Light products:										
n-Butane, vol. %	1.7	1.9	3.2	1.2	1.5	2.2	1.8	1.7	1.5	2.9
Isobutane, vol. %	4.4	5.2	7.9	4.5	5.4	7.0	6.0	5.1	5.5	5.7
Butenes, vol. %	1.8	2.3	4.8	1.4	3.3	3.5	6.3	2.5	3.9	6.5
Propane, wt. %	0.8	1.9	3.4	0.8	1.6	2.1	3.2	1.1	1.6	2.2
Propene, wt. %	1.4	2.1	3.5	0.9	2.2	2.2	4.7	1.8	2.7	4 7
C_2 and lighter, wt. %	0.9	1.4	6.1	6.0	3.7	2.4	9.9	1.1	1.9	5.1
Cracking efficiency†	90.6	85.4	64.5	92.1	80.0	78.5	60.1	86.8	79.4	65.8
Catalytic motor gasoline:										
°A.P.I. gravity	55.3	56.2	55.5	57.0	56.5	55.9	55.4	56.0	55.0	53.6
Distillation, A.S.T.M., °F.:										
I.b.p.	96	95	93	101	94	89	96	99	97	96
10%	135	126	125	131	122	121	120	129	125	122
50%	268	241	241	257	240	240	223	244	244	237
90%	388	398	380	385	390	396	386	385	390	387
End point	425	426	433	423	425	438	422	424	425	430
R.v.p.	10.2	9.9	9.6	9.7	10	10.2	10.5	10	10	10
Sulfur, wt. %	0.06	....	0.04	0.06	....	....	0.06	0.07	....	....
Octanes:										
A.S.T.M. clear	76.2	77.7	80.4	76.2	77.0	78.9	81.0	79.0	80.8	80.8
Research clear	85.0	87.0	92.0	84.1	....	90.2	94.4	89.9	91.7	94.3

*Catalyst, synthetic bead. †$\left(\frac{\text{10 psi. R.v.p. motor gasoline}}{\text{Conversion}} \times 100\right)$.

from 78.2 at 850° F. to 80.8 at 950° F., while for the same temperature increment the leaded octanes increase from 82.6 to 84.3 with 1 cc. TEL but from 85.4 to only 86.0 with 3 ccl. TEL. Thus, the gain in unleaded A.S.T.M. octane from increased reaction temperature is greatly reduced at the 3-cc. TEL level. On the other hand, this behavior is not duplicated in the case of Research octanes. The gain in unleaded Research octane values with increasing reaction temperature is greater for the same change in temperature than is noted for A.S.T.M. octane values.

The data presented in Table 2 were crossplotted to obtain the graphs shown on Fig. 3. The right graph shows the relation between average reactor temperature and the yield of 10-psi. R.v.p. motor gasoline at several conversion levels. Of particular interest is the marked loss in gasoline yield that occurs at constant conversion as the reaction temperature is increased. For example, at a constant conversion level of 55 per cent the gasoline yield decreases from 44.1 per cent by volume of charge at 850° F. to 37.9 per cent at 950° F. The loss in gasoline yield, however, may be partially offset by catalytic polymerization of the C_3 and C_4 unsaturates but with increased operating and investment costs. Stated in another way, an increase in average reactor temperature from 850° to 950° F. decreases the cracking efficiency from 80.4 per cent to approximately 69 per cent, indicating the production of increased quantities of dry gas.

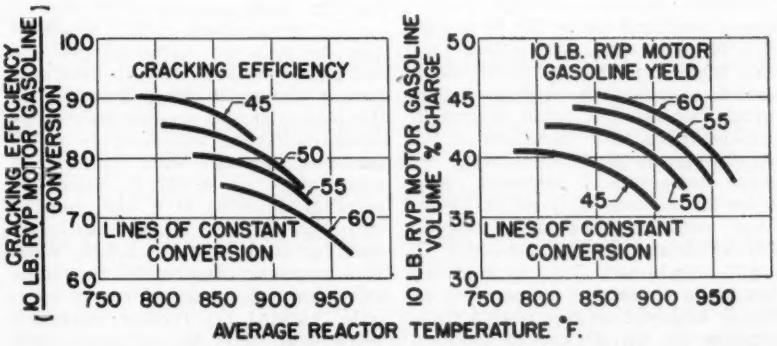


Fig. 3—Effect of reactor temperature on cracking efficiency and motor-gasoline yield

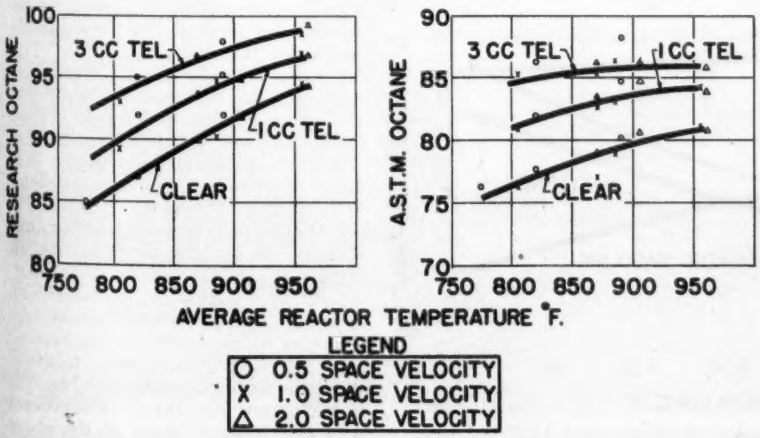


Fig. 2—Effect of reactor temperature on A.S.T.M. and Research octanes

From a consideration of both yield and quality factors, it can be seen that the economical operation of a catalytic cracking unit involves a balance among gasoline yield, cracking efficiency and octane values. Therefore, from the basic data presented in Table 2, an economic analysis has been made to show the effect of reaction temperature in the T.C.C.

process on investment and earnings. Two refinery situations were considered, one in which the production of a 10-psi. R.v.p. motor gasoline having an A.S.T.M. octane number of 80 was contemplated, and the other in which the production of a 90 Research octane gasoline was the basis. In each case it is assumed that polymer gasoline is produced from recovered C_3 and C_4 unsaturates and that final gasoline blends are compounded from T.C.C. gasoline, polymer gasoline, and straightrun gasoline of 55 A.S.T.M. octane number plus the addition of tetraethyl lead. Operations apply to a T.C.C. plant of 10,000 bbl. per day capacity, and yields were selected at several temperature levels at conditions of constant coke deposition on the catalyst. The following price structure was used in the calculations:

	$/Bbl.
Gas-oil charge	1.43
Straightrun gasoline	2.50
Motor gasoline, 80 A.S.T.M. octane, 10 psi. R.v.p.	3.15
Motor gasoline, 90 Research octane, 10 psi. R.v.p.	3.15
No. 2 fuel oil	2.20
No. 6 fuel oil	1.43
Fuel gas (F.O.E.)	1.43
Excess B-B (F.O.E.)	1.43

Relation between average reactor temperature and the yields of propylene, butylene, and debutanized gasoline made in the catalytic cracking operation, is shown in Fig. 4. The curves illustrate the rapid decline in gasoline yield and increases in C_3 and C_4 unsaturate production as reaction temperature increases. Also shown in the over-all yield of 10-psi. R.v.p. motor gasoline after catalytic polymerization of the recovered C_3 and C_4 unsaturates. This curve shows that up to a reaction temperature of 875° F. catalytic polymerization compensates for the decline in gasoline yield but at higher temperatures the loss in gasoline yield from overcracking exceeds that which may be recovered from polymerization.

Fig. 5 is a graphical representation of the results of a study prepared to show the effect of reaction temperature on following economic factors:

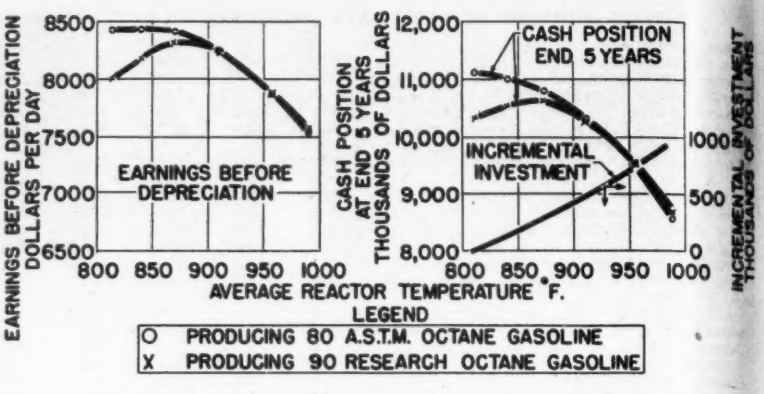


Fig. 5—Economics of T.C.C. processing at various temperatures, cracking East Texas heavy gas oil, synthetic bead catalyst

1. Earnings, before depreciation.
2. Cash position at the end of 5 years after considering direct operating costs and complete amortization of the investment but excluding refinery overhead, taxes, and insurance.
3. Incremental investment.

The left-hand graph shows earnings before depreciation in dollars per day as a function of average reactor temperatures. It will be noted that on an A.S.T.M. basis, earnings do not change up to a temperature of 875° F. Above this temperature earnings decrease sharply as average reactor temperature is increased. When gasoline, on the other hand, is manufactured to a Research octane specification of 90, earnings increase with increase in temperature up to 875° F.; thereafter earnings decrease at a rate parallel with the decrease in earnings when manufacturing on an A.S.T.M. basis. This, however, does not tell the whole story since as temperatures in catalytic cracking are further increased, investment must be increased since a larger gas recovery plant and a larger catalytic polymerization unit are required.

The right-hand graph of Fig. 5 illustrates the variation in reactor temperature and cash position at the end of 5 years. In determining the cash position the base investment at 810° F. plus the incremental investments for increased gas plant and polymerization facilities were completely amortized. It will be noted that the curves showing cash position are quite similar to those showing earnings before depreciation, although on the A.S.T.M. basis there is slightly more advantage to operating at temperatures lower than 875° F. On the other hand, when operating to produce 90 Research octane gasoline the optimum cash position is still at 875° F. Although the calculations indicate that 875° F. is the optimum reaction temperature for the specific example developed on a given charging stock and type of catalyst, it should be emphasized that the results apply to one charging stock only; furthermore, similar calculations prepared for refinery octane levels other than those considered in the illustration, even on the same charge, will show different optimum operating temperatures.

Over-all effects produced by change in reaction temperature summarize:

1. Increasing average reactor temperature increases octane number as measured by both the A.S.T.M. and Research methods, with the increase in the Research result being approximately double the A.S.T.M. increase.
2. The gain in A.S.T.M. clear octane values resulting from increase in reaction temperature is substantially lost upon the addition of 3 cc. TEL and even at moderate amounts of lead the gain is minimized. Conversely, with Research values the gain in clear octane number is practically retained.
3. Gasoline yield decreases at constant conversion as average reactor temperature increases.
4. Yields of propylene and butylene increase as reactor temperatures increase.
5. C_{4-} liquid recovery decreases with increased average reactor temperature and the yield of dry-gas increases.
6. Selection of optimum temperature can be made only after an economic study has taken into account a proper balance of all of the above factors.

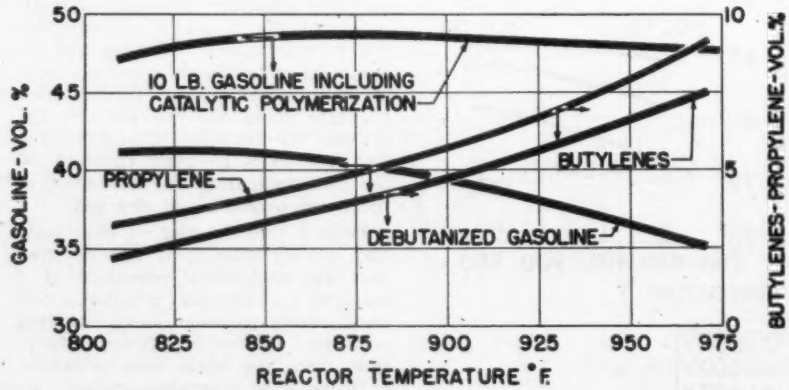
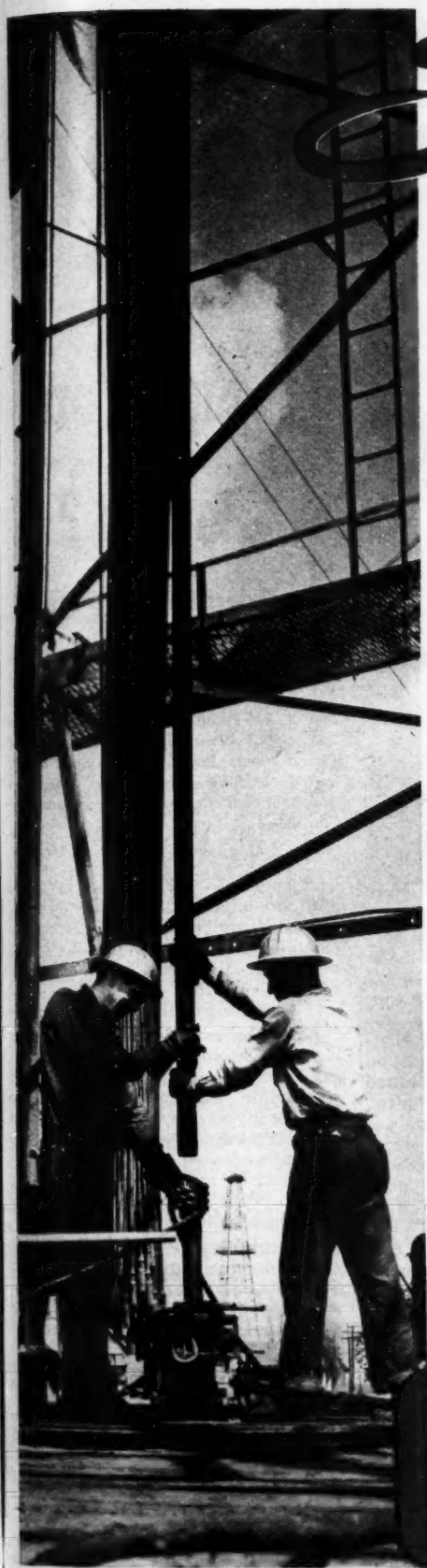


Fig. 4—Effect of temperature on product distribution from T.C.C. cracking of East Texas heavy gas oil over synthetic bead catalyst



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Is Corrosion Taking $ $ From Your Pocket?

Fig. 1—(Left, top) Extensive corrosion, such as that indicated on this sucker-rod coupling, seriously weakens well equipment, and if left uncontrolled, will ultimately result in expensive fishing or workover jobs. Fig. 2—(Left) Longitudinal section of this corroded tubing shows pitting which has gone through the wall, necessitating replacement

by Bradford J. Cotey*

EVERYONE engaged in the production of oil has encountered various types of corrosion. Corroded tubing and pitted sucker rods (Figs. 1 and 2) which lead to equipment breakdown, well failures, expensive repairs, and fishing jobs are familiar sights in many oil-producing areas. When excessive corrosion occurs in stripper wells, the cost of frequent pulling jobs may threaten the profitable operation of the well.

Regardless of how much oil a well is producing, if corrosion is occurring it is taking dollars out of the operator's pocket. Direct losses from corrosion run into hundreds of thousands of dollars annually, and an inestimable amount is lost indirectly because of loss of production and lowering of ultimate recovery caused by early abandonment of otherwise productive wells. In some parts of California, West Texas, Kansas, and other fields a standard string of tubing may require replacement in a matter of weeks or few months as a direct result of corrosion.

Many efforts have been made to control corrosion in oil wells. Tubing, rods, working barrels, and other pump parts have been made of special corrosion-resistant alloys. Chemical treatment of the water phase has been instituted in an attempt to control scale deposition as well as corrosion. Various types of plastic coatings as well as cathodic protection have been employed. Each method has some merit. Matters of control, cost of treatment, means of application and maintenance, and various other factors have to be considered in each case.

*Technical department, Turco Products, Inc., Los Angeles.

New Chemical Treatment

Of interest in the problem of corrosion is a new chemical treatment which offers convenient, low-cost corrosion control. Field results show that quantities as low as 1 pt. per day have measurably reduced the number of pulling jobs attributed to corrosion.

Corrosion in oil wells is a surface phenomenon. Regardless of the direct cause, whether by hydrogen sulfide, electrolysis, or corrosive water, corrosion can be controlled by chemical treatment of the metal surfaces involved. Proper application of the chemical builds a uniform and protective film on the metal surfaces exposed to the fluid being produced. The chemical is dispersed in water and on contact with metal is strongly adsorbed on the metal surface to establish a film of molecular thickness. The film acts to insulate the metal from the corrosive medium, and thus control the corrosion.

After the film is established, it is not easily removed by the fluid being produced, since it is essentially immiscible with oil in contrast to completely oil or water-soluble chemicals. Consequently, it is unnecessary to treat each well continuously. Treatment can be made every 2 or 3 days and in some instances at longer intervals.

The inhibitor is used in relatively small amounts, and since its action is confined to metal surfaces, its presence does not affect the oil or water phase and consequently will not interfere with the performance of electrical dehydrators and will not alter any chemical treatment being used for the breaking out of water.

The chemical treatment described has been successfully used in many wells. Cases are on record of wells that have produced continually for several months where prior to the use of a chemical inhibitor corrosion forced shutdowns as often as once a month. Further convincing proof of the value of this treatment is found

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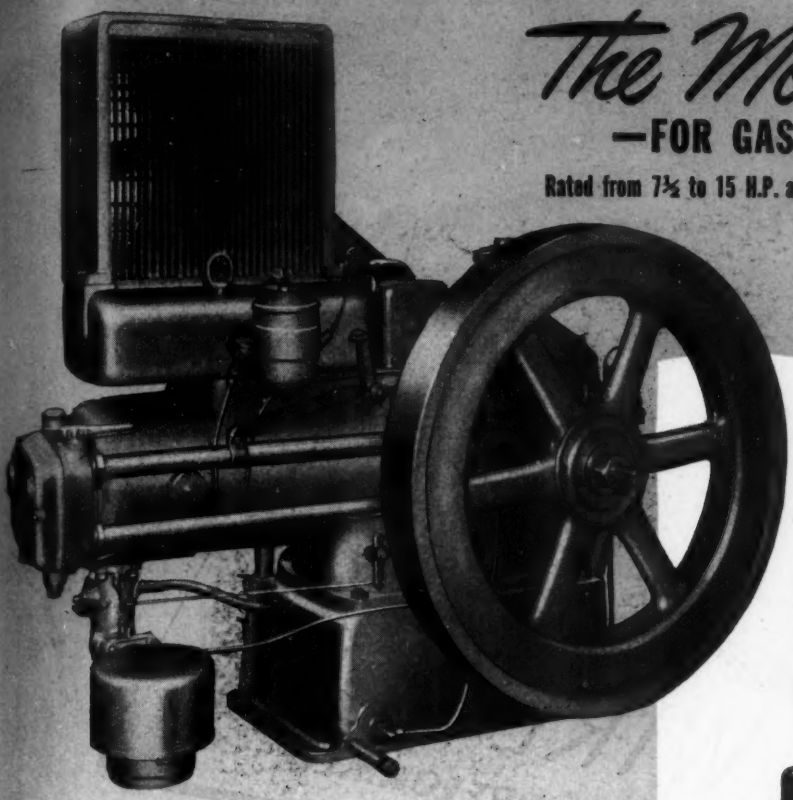

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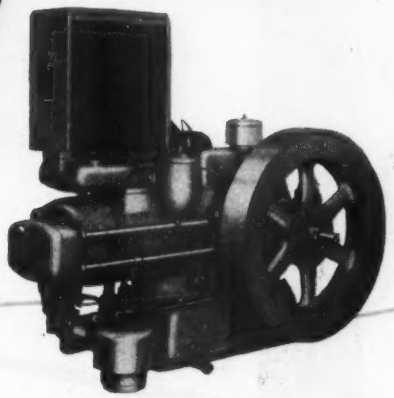

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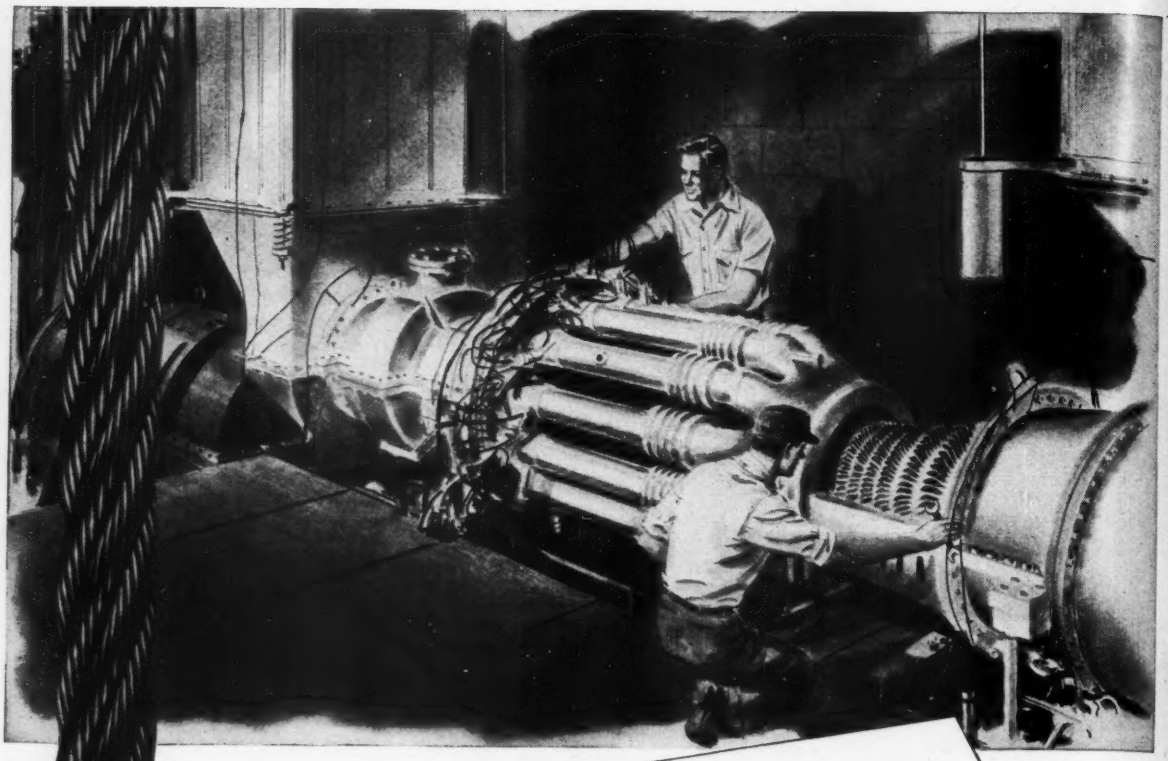

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in the case histories of the following three California wells.

Case History of One California Well

Dec. 6, 1944, Hole in tubing. Replaced joint.
Feb. 2, 1945, Hole in tubing. Replaced joint.
Mar. 12, 1945, Hole in tubing. Replaced joint.

Approximately one-half of string replaced with new tubing. Chemical treatment begun with two quarts diluted in 25 gal. of water every other day.

Sept. 16, 1945 ..... Hole in tubing
Dec. 23, 1945 ..... Hole in tubing
May 15, 1946 ..... Hole in tubing
Nov. 26, 1946 ..... No trouble

From December 6, 1944, to March 12, 1945, a period of 96 days, it was necessary to pull the tubing in the first well three times to replace corroded joints, an average of once every 32 days. The cumulative effect of these shutdowns every 32 days represents a distinct deficit. Not only is production lost, but the cost of equipment replacements adds materially to the over-all lifting costs of the lease.

In contrast, from March 12, 1945, when the chemical treatment was introduced, to November 26, 1946, a period of 624 days, it was necessary to pull the tubing only three times, an average of once every 208 days. It was noted that all holes occurred in the older tubing where corrosion was already established. On the basis of the previous corrosion rate, 18 pulling jobs were eliminated by the use of only 1 qt. of chemical per day.

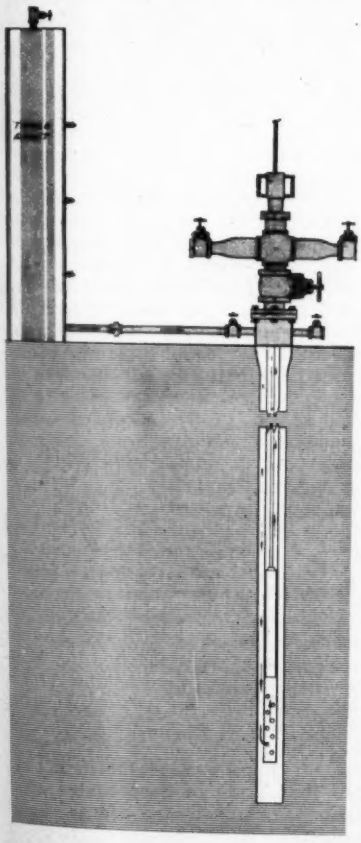


Fig. 3—Diagrammatic sketch shows manner of application and inhibitor for coverage necessary for complete corrosion control

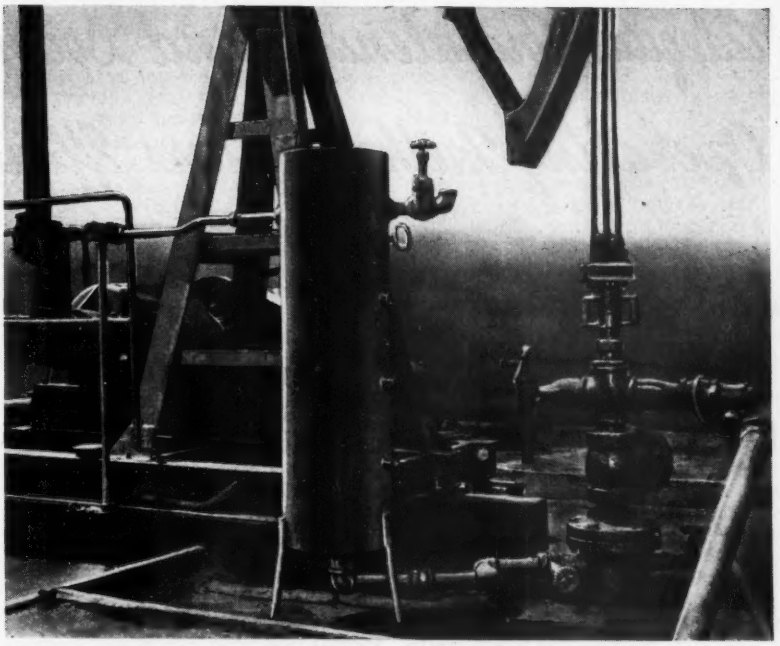


Fig. 4—Elset lubricator with permanent water line connected for diluting the inhibitor prior to introduction into casing annulus

Case History of Second California Well

Sept. 1, 1944 ..... Hole in tubing
Dec. 1, 1944 ..... Hole in tubing
Jan. 6, 1945 ..... Hole in tubing
March 13, 1945 ..... Hole in tubing
April 7, 1945 ..... Hole in tubing
July 19, 1945 ..... Hole in tubing

Entire new string of tubing installed. Started using 2 qt. of chemical inhibitor every other day diluted with 25 gal. of water.

Nov. 20, 1945.. Tubing pulled for inspection
Apr. 8, 1946 ... Pump barrel corroded
Apr. 25, 1946.. Hole in tubing
May 26, 1946.. Hole in tubing
July 25, 1946.. Hole in tubing
Nov. 26, 1946.. No trouble

From September 1, 1944, to July 19, 1945, a period of 322 days, a pulling job was required once every 54 days on the second well. An entire new string of tubing was installed and chemical treatment was introduced at a rate of 2 qt. every other day. From July 19, 1945, to November 26, 1946, a period of 495 days, four pulling jobs were required, an average of once every 124 days. A study of the well's history prior to the application of the chemical treatment indicated that the amount recommended would be adequate. While better than a 50 per cent reduction in pulling jobs was obtained, better performance may be expected with a slight increase in the amount of chemical.

Case History of Third California Well

Mar. 22, 1945.... New string of tubing
July 23, 1945.... Hole in tubing
Aug. 1, 1945 .... Hole in tubing, 12th stand
Aug. 10, 1945 ... Hole in tubing, 15th stand

Started adding 1 gal. chemical per day for 30 days diluted with 50 gal. of water.

Sept. 9, 1945... Chemical treatment discontinued
Oct. 14, 1945.... Pump shoe corroded
Oct. 15, 1945.... Hole in tubing—25th stand
Dec. 16, 1945 ... Rods parted
Dec. 23, 1945 ... Pump shoe corroded
Jan. 2, 1946.... Hole in tubing—29th stand
Cathodic protection installed on rods
Jan. 20, 1946.... Rods parted—19th stand
Jan. 26, 1946.... Rods parted—2nd stand
Jan. 28, 1946... Hole in tubing—29th stand
Feb. 4, 1946 ... Hole in tubing
Feb. 14, 1946... Hole in tubing—16th stand
Mar. 12, 1946... Hole in tubing—31st stand

The history of the third well is interesting in that it graphically illustrates the results of using chemical corrosion control for a limited period of time. The corrosion is not confined to a definite horizon but varies from the second to the thirty-first stand which is approximately 2,700 ft. Starting with a new string of tubing on March 22, 1945, corrosion on the inside of the tubing necessitated pulling three times from July 23, 1945, to August 10, 1945, an average of once every 6 days. On August 10 and for a period of 30 days chemical inhibitor was added at the rate of 1 gal. per day. Despite the relatively short treatment, 64 trouble-free days of operation can be directly attributed to the use of corrosion-control chemicals.

On October 14, 1945, corrosion again manifested itself and in the following 149 days 11 pulling jobs were necessary, an average of once every 13 days despite the installation of cathodic protection on the rods on Jan-

(Continued on page 92)

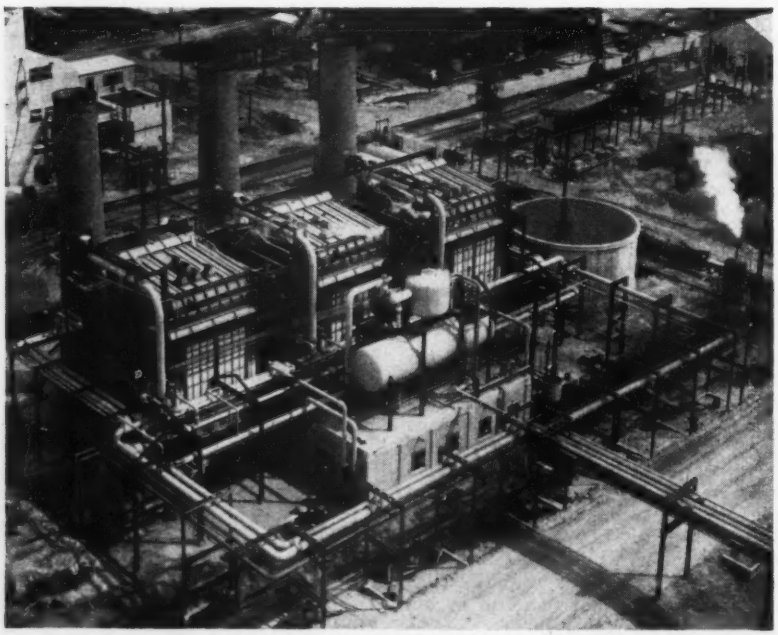
Adequate Maintenance and Sound Operating Methods Assure Efficiency of STEAM POWER PLANTS

by R. B. Tuttle

OVER-ALL efficiencies of the average steam-generating plant serving medium and small refineries are indicated to be much lower than is justified, according to recent information on the operation of a number of such units. Probable major factors responsible for the low-operating-efficiency status of plants within this group are inadequate maintenance and unsound operating methods. The former of these factors has had some justification during the recent war years when repair parts and maintenance materials were difficult to obtain. However, the latter, which may be the larger contributor toward poor efficiencies, is apparently without justification. In emergencies, rule-of-thumb methods usually prove satisfactory to maintain production but in general such measures seldom provide maximum operating efficiency. The best proof that general rule-of-thumb practices fall short of the efficiencies obtained when practices based on sound engineering principles are employed may be found in a plant's operating history.

Operating histories or plant records are relatively simple to maintain and cause no additional burden on the operating personnel to whom the duty of their upkeep is assigned. To the normal plant operator, history records of the plant's past operations can mean much in regard to the plant's present performance if such records are accurate and continuous. In those plants where records are inadequate, poorly maintained, or not maintained at all, memory reference to past operations must be relied upon to supply the needed information. And at its best, information of this type is not reliable for even general comparison.

Records of plant operations, as a minimum, may include the important parts of operation or may include all the directly and many of the indirectly associated parts as best suited for the particular unit. Like all other processing units, steam-generating plants should be operated to show as high yield efficiencies, relatively, as are obtained from the units they serve; consequently their performance records should be equally important. Many of the plants operating today do not have suitable means for determining their production rates for given periods and production cost figures for many of them are little more than estimates.



Built during the war years, this power plant is equipped with sufficient control apparatus to insure peak operating efficiencies. The boilers and accessories in the unitized installation are of the latest design

Plant Operations Compared

Such data as are desirable for a plant's operating record, except in certain specific cases, are common to all industrial steam-generating units. However, the extent of apparatus, the source from which operating data are obtained, is often varied according to plant size. A typical example of how apparatus is varied according to the size of the plant is shown by comparing the plants operated by companies A and B. Company A operates its plant with more recording instruments than does company B, but generates five times as much steam, at the same pressure, as generated by plant B, yet employs the same number of operators for its six boilers and their accessory equipment as is employed by the other plant for its three units. When reduced to a common basis for comparison the plant of company A shows no higher over-all performance efficiency but the down time charged against individual boilers is less in this plant than in the plant of company B. Why the plant of company A reports less down time per unit than is reported by the other company, when all operating factors for each plant are relatively equal, is due to the day-to-day study and analysis of the continuous records for the purpose of eliminating trouble that leads to unscheduled down time according to the company's engineers.

During the first year after the recording equipment had been in operation at this plant, the engineers made

an extensive study of all automatically and manually recorded data in order to determine the inherent characteristics of each boiler unit under the combination of seasonal and refinery-demand variations. Based upon their findings the engineers recommended a number of changes in operating procedures and methods which were subsequently put into effect. These recommendations were followed by others which included minor changes in equipment and accessories and incidental operating changes. The final outcome of the program is the present-day plant of company A which produces steam at a yearly average cost figure that is well below those of the other plants of the same general type. Low maintenance plus good efficiency, both of which are due to adequate records and competent engineering are responsible for this plant's enviable showing on production costs.

Except for a very few cases reports on the operations of the steam-generating plant or boiler house are maintained primarily to supply information for accounting purposes and in some instances effort has been made to combine this type of report with one that supplies engineering information because some of the data are overlapping. Reports of combination type have proven reasonably successful where set up to include sufficient data to meet the requirements of specific engineering needs and accounting procedures. Where the original interest in a report is pertinent to accounting and sufficient data for engineering purposes are not included therein, as is the usual case, a supplementary report which includes the additional data required for engineering gives satisfactory results. Frequently this procedure is reversed but in general such arrangement is unsatisfactory to the accountants unless the information used in their work is grouped in the report in such manner that little difficulty is met in accumulating and identifying it for their regular records.

Instrumentation Layout

The instrument layout for the steam-generating plant in the refinery appears to be inadequate when compared with that in the usual utility plant. When considering the basic difference between the two types of plants the scarcity of recording and control instruments in the average refinery boiler house is difficult to justify in most cases. In general all operations in the utility plant point toward efficiency such as relatively uniform load demands and low ratios of makeup water to steam produced. Because of conditions common to the industry neither uniform production rates, high recovery of condensate, nor any of the other operational advantages of production efficiency are present in normal refinery boiler-plant operation. Although adequate instrumentation is not the full solution to the problem of better efficiencies in the operation of industrial steam-generating plants, economics often justify its application where operating conditions vary widely.

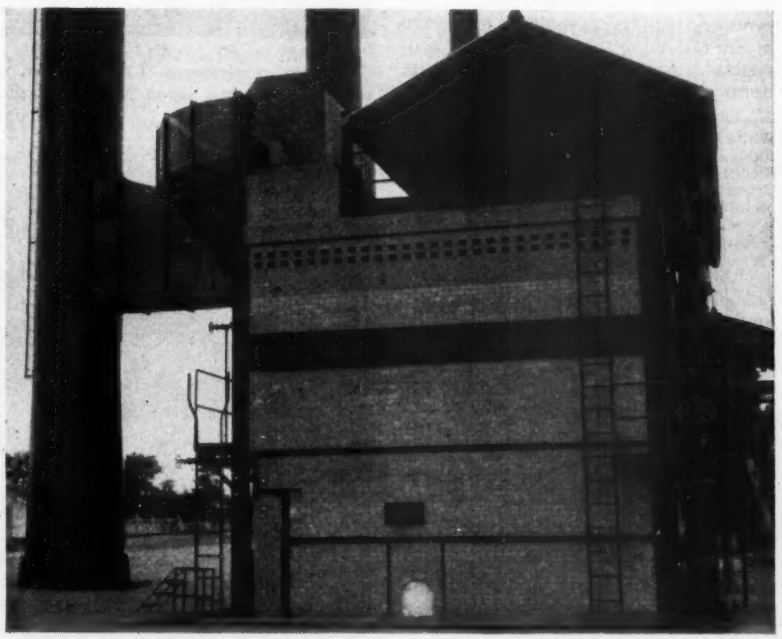
An abundance of fuel appears to have some effect on refinery boiler-plant efficiencies and particularly in many of the cases where byproduct materials from the processing section of the refinery are used for boiler fuels. Also the availability of refinery wastes for boiler fuel has a direct effect on steam production costs in many of the refineries; consequently relatively low prices charged for boiler fuel are seldom conducive to combustion efficiency. However, such is not true in all cases as for example, the several refineries where sludges are used for boiler fuel. Most of the installations for sludge burning in the Mid-Continent area refineries are operated efficiently with little if any room for improvement. On the other hand, with few exceptions, the average gas-fired boiler plant using a mixed fuel of refinery and natural gas shows often relatively poor combustion efficiencies. Variations in fuel composition appear to be the major cause of the relatively low combustion efficiencies in most of the plants where mixed gases are burned. Frequently time-to-time adjustments in the combustion equipment may prove advantageous but as a rule such methods are not practicable. A system for automatically controlling the combustion of mixed gases under widely varying conditions can be worked out for nearly any boiler installation and oftentimes the investment may be retired in a short time from its savings in plant operating costs.

The application of automatic instruments to the control of the average industrial steam-generating plant appears to be limited only by initial costs which, without support from adequate engineering investigations of the specific case, is doubtful economics.

Production-Expense Breakdown

The advantages of adequate maintenance in the operation of steam-generating plants in the average refinery may be illustrated in the breakdown on production-expense figures of two comparable refineries operating in the Mid-Continent area. These plants each operate at an average over-all efficiency of 75 per cent and their average cost of steam production on a yearly basis of $0.1805 per 1,000 lb. exclusive of depreciation. Heat content of the steam generated at each of these plants differs by less than 2 B.t.u. per pound, due to slight differences in superheat temperatures. Boiler units in the plants are operated at an optimum per cent of rating which for the two plants averages 195.

Normal demands at each of the refineries are within ranges found in others of the same general type. The factors which determine optimum per cent of rating are slightly different for each boiler plant with the result that one plant shows this figure at



This outdoor boiler installation in a medium-capacity refinery is operated at high efficiencies even during extreme weather conditions. Investment figures for this type of unit as a rule are considerably under those of the conventionally housed installation

200 whereas the other reports 190. This difference in per cent of rating has no appreciable effect on maintenance costs as the plant operating at the higher figure reports maintenance costs of less than 1 per cent above the other. An average of the two shows that 5.66 per cent of the total production cost is made up of maintenance labor and material. Ratio of labor to material is around four for labor to one for material.

For many years neither of these refineries has experienced emergency shutdowns for repairs to boilers and other equipment operated in conjunction with the steam-generating plants. All downtime charged to the individual units is according to a fixed schedule which is set up to allow ample time for making any repairs that may be necessary to mee company inspection standards. Based on A.S.M.E. recommendations, the inspection standards of each company are wide in scope and are enforced rigidly.

Instrumentation in these plants is well above the average for providing operating information for both accounting and engineering purposes. Although no direct association exists among the operating personnel of either refinery the boiler plant reports used by each, with little exception, contain like information. No variation exists in the type of basic information given in the reports, but there is a variance in details which may be correlated when the operating background of each plant is known.

Average Operating Cost

Average operating costs, in terms of per cent per 1,000 lb. of steam produced, for the two plants are given in the following tabulation which represents a summary of related expense items detailed in the reports:

	Per cent
Water (including treating	4.29
Fuel	77.37
Electric power and misc. supplies	1.13
Operating labor	11.55
Maintenance (incl. labor and mat'l.)	5.66
Total	100.00

Other steam-generating plants in refinery service in the Mid-Continent area show a wide variance in the structure of their operating costs. For example, fuel costs may run into the 60-65 per cent, of per cent cost per 1,000 lb. bracket or even lower and feed-water treating, including the price of raw water, may go as low as a few per cent or as high as 15 or 20 per cent. Direct labor is shown to be reasonably constant for the plants of comparable capacity but maintenance labor and material vary widely according to the age of the plant and to operating methods and company policies. Without regard to the efficiency of the individual plants an average operating cost based on nine plants in the Mid-Continent area comes to 11.3 per cent higher than that given previously for the two relatively efficient plants.

Even when including depreciation in the cost of producing steam, these two plants with a larger chargeoff figure show results only slightly higher than is shown by some of the less efficient units having smaller depreciation charges. In general the more efficient plants represent much larger investments than are set up for the other plants, but a breakdown on cost data does not support the idea that the inexpensively built or the smaller unit cannot be operated at high efficiencies. The figures from one inexpensive installation, producing around 100,000 lb. per hour of 250-psi. superheated steam, having a total temperature of 500° F., show a production cost of $0.1635 per 1,000 lb. including depreciation, and should be a good indication that size has relatively little bearing on production costs. The good engineering methods employed in operating this plant are responsible largely for low-cost production.

In contrast to these efficiently operated plants, several others, of the same general type, report figures that show their operating efficiencies fall within the 55-65 per cent bracket. Two of these plants in the low-efficiency range are equipped with the same general type boilers and accessories and produce steam of comparable volumes and quality. Cost averages for the two plants work out

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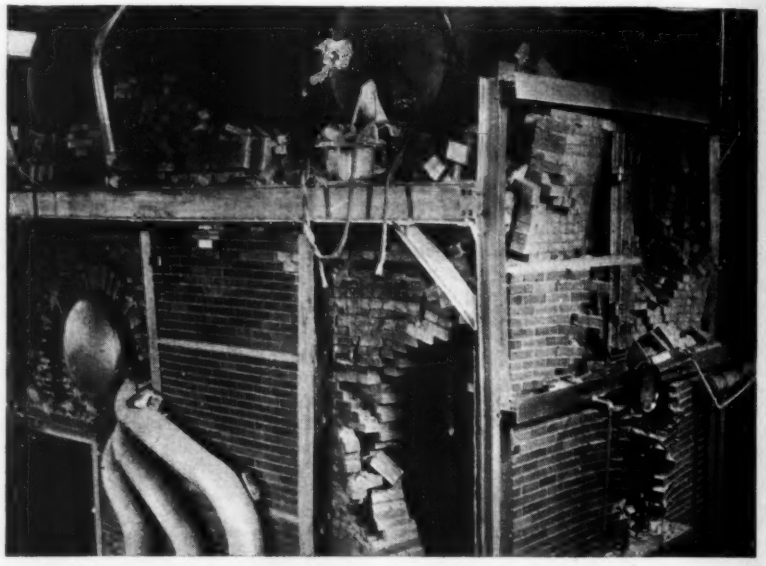

Caused by carelessness of the operator, an explosion in the furnace of this installation resulted in a costly repair job. (Photo courtesy Hartford Steam Boiler Inspection & Insurance Co.)

Corrosion was responsible for the boiler explosion which caused the damage shown here, according to investigation reports. (Photo courtesy Hartford Steam Boiler Inspection & Insurance Co.)

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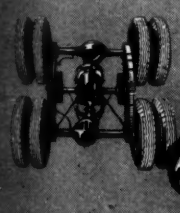

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Well Completion and Remedial Work with Plastics

by A. A. Townsend and R. H. Smith

PLASTICS as they are now used in oil or gas wells for remedial and completion work are thermosetting materials possessing a specific gravity of 1.2 which is the equivalent of 10 lb. per gallon. They are dark brown in color having the consistency of 50 S.A.E. motor oil. These plastics set under heat and where bottom-hole conditions are maintained do not exhibit the friability which may exist in some domestic plastic articles. The temperature range at which liquid plastic materials can be applied is from a minimum of 50° F. to a maximum of 350° F. To cover this wide range in bottom-hole temperature, three separate plastics are used. Plastic "A" is used in the low-temperature range, "B" for the intermediate range, and "C" for the higher temperatures.

The solidifying of these plastics after they are placed in a well is entirely dependent upon the temperature at the depth at which the plastic is applied, pressure having no particular effect. Therefore, it is imperative that the temperature at the desired depth be known within close limits.

The time required for any plastic to solidify at a given temperature is controlled by the addition of catalysts. These catalysts have no effect upon the physical characteristics of the plastics after they solidify, nor do they enter into any chemical reactions with the formations present.

The average time involved for the plastic to set in the wells is approximately 8 hours. However, this time can be shortened or lengthened as the situation presents itself.

Sand-consolidation plastics have different physical properties from those plastics which are used in other oil-well applications. These particular materials have a specific gravity of 0.97, a surface tension of 36 dynes, and a viscosity of 1.5 cp. They can be applied in a temperature range of 105° to 350° F. The average time involved for this type plastic to harden is 24 hours. Its purpose in a well is to consolidate the formation and yet retain sufficient permeability within the formation to allow fluid production.

Development

During the early use of plastic, it was introduced into a well primarily by the bailer method for selective plugging of completion intervals. During this early development period over 3,000 wells were successfully reworked by this procedure. The method proved to be satisfactory and is being used today in practically all areas. However, there is a limit to the type of well where such procedure is justified.

During this interval it was realized that there was a definite need for an

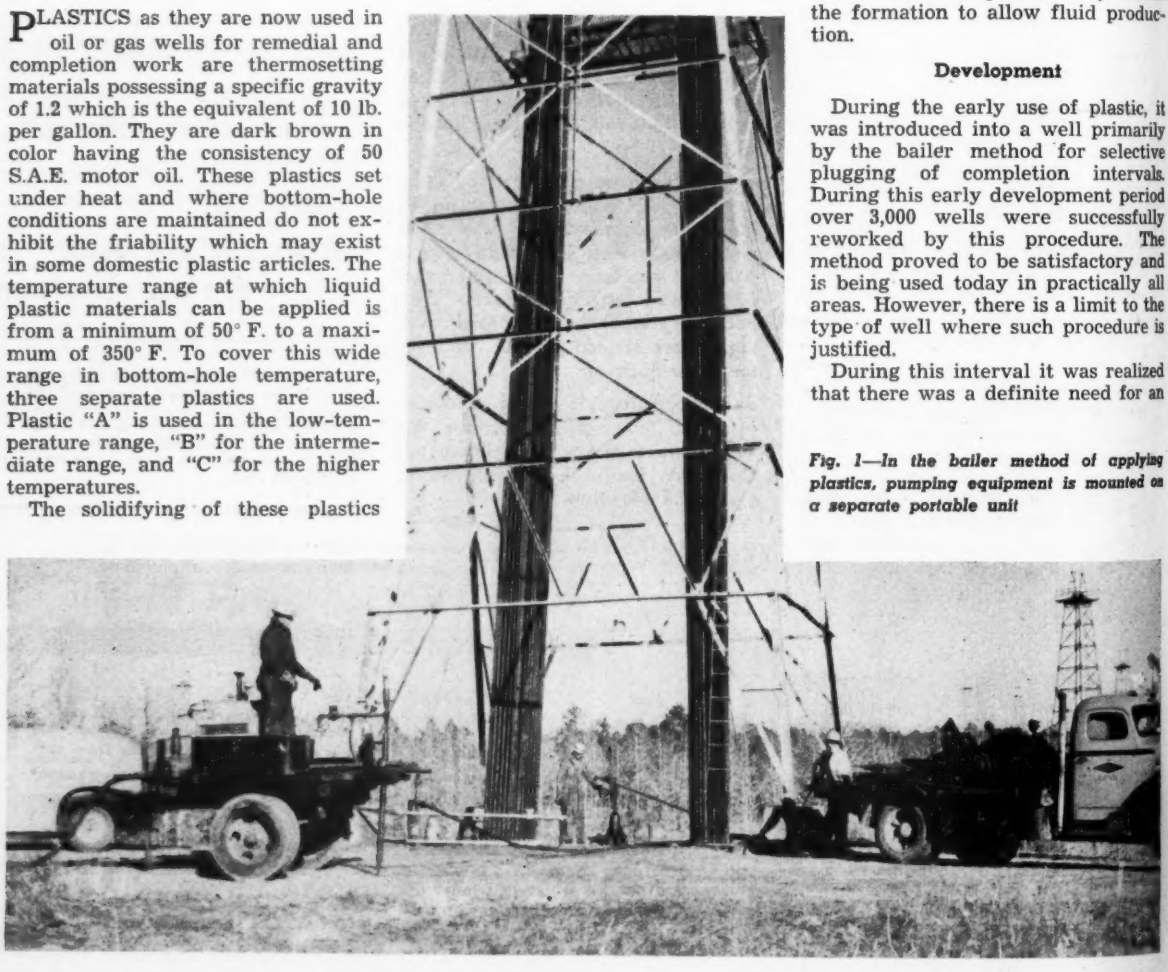

Fig. 1—In the bailer method of applying plastics, pumping equipment is mounted on a separate portable unit

THE AUTHORS

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Smith graduated from University of Texas in 1939 and was with Stanolind Oil & Gas Co. in Texas for 4 years. He then affiliated with Dowell Incorporated, and is district engineer for that concern at Houston.

This article was presented at the spring meeting of the southwestern district, Division of Production, American Petroleum Institute, held at Fort Worth, March 27-28.

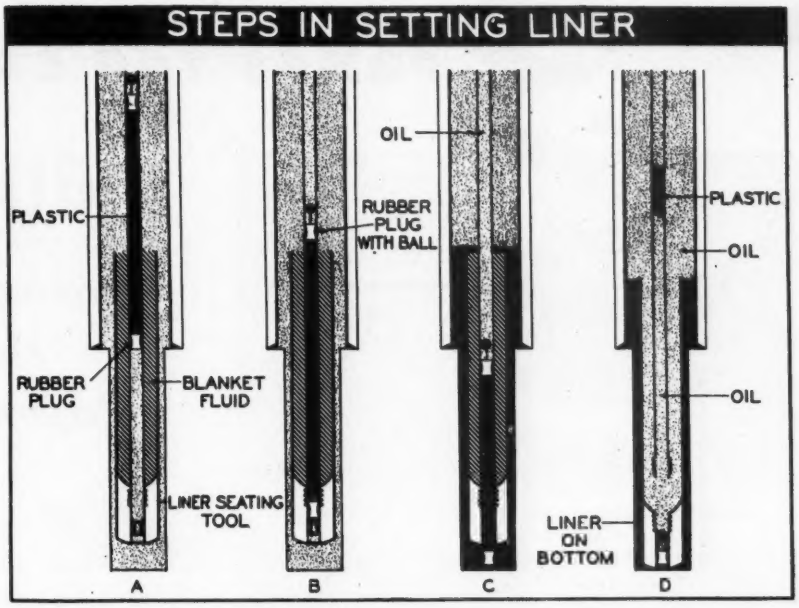

Fig. 2—Position of plastic is shown at four successive stages in a liner setting operation

additive material or filler which would control the penetration of the liquid plastics into the formation. In the development of such fillers, many materials were tried before a combination of several inert solids proved to be suitable. At the present time, controlling the penetration of the liquid plastic into the formation is accomplished by adding graduated ground solids in definite proportions by weight to the liquid plastic. The degree of maximum penetration into a sand can be controlled, regardless of the permeability, within an accurate range from 1 to 8 in. when applying normal differential pressure. These penetration tests have been verified by joint cooperation of several major company laboratories.

From the foregoing information it appears that it would be possible to calculate accurately the volume of filler plastic necessary to "squeeze" or "plug off" a known completion interval. On the contrary, however, these calculated volumes have been inadequate in the majority of cases, thereby indicating the presence of channels or fractures. Therefore, it can be concluded that before a successful "squeeze" or "plug off" job can be accomplished under such conditions, these existing channels or fractures must be closed, and, to accomplish this, an additional volume of plastic is required.

The question sometimes arises as to the degree of penetration obtained by gun perforating through casing, plastic and sand. Numerous tests made by various service companies and witnessed by oil-company representatives indicated the following:

1. Maximum penetration of 11½ in. was obtained using the standard ½-in. bullet with a 4-in. o.d. gun and firing through 5½-in., 18-lb. N-80 casing into plastic set up in sand.

2. Minimum penetration of 5½ in. was obtained under identical conditions.

3. The average of all shots definitely indicates that one may expect

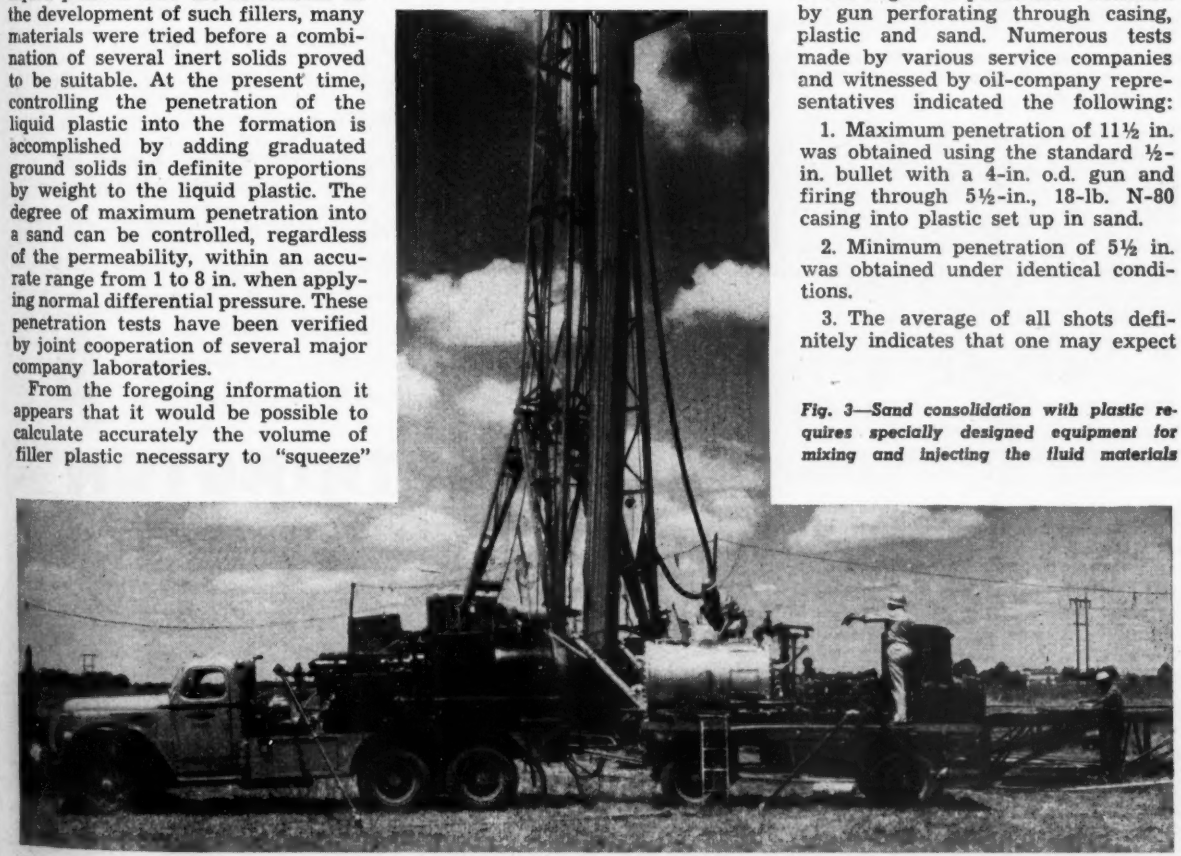

Fig. 3—Sand consolidation with plastic requires specially designed equipment for mixing and injecting the fluid materials

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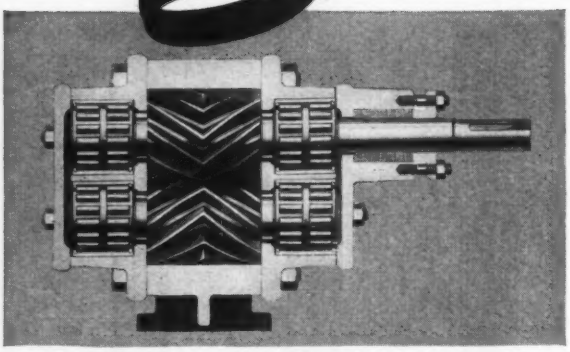
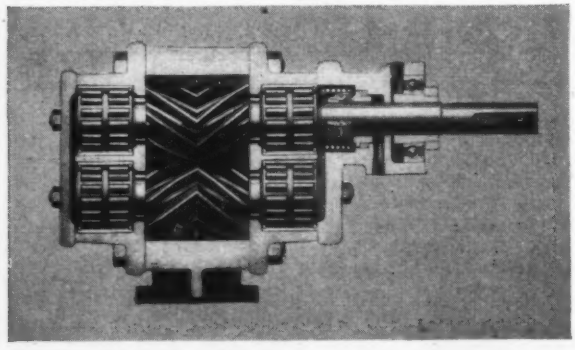
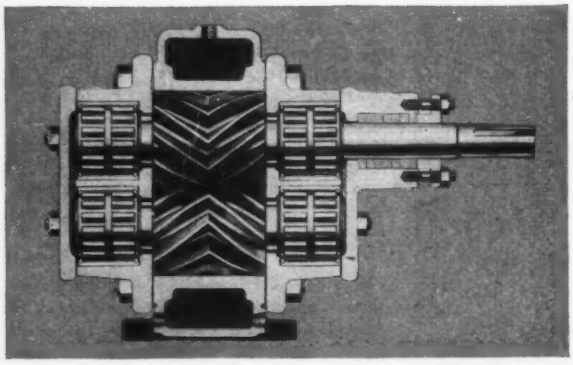


Longitudinal section through standard GR type rotary pump.



Longitudinal section through GRMI type rotary pump provided with mechanical bellows-type seal and inboard bearing for overhung drive.



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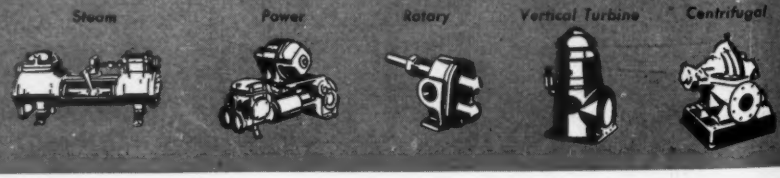

to penetrate 5½-in. casing and plastic in sand for 6 in. in depth.

Methods of Application

Filler plastics have been used to solve the following problems:

1. Repairing cement failures.
2. Shutting off excess water or gas.
3. Setting blank liners.
4. Setting casing.
5. Zone abandonment.
6. Setting bridge plugs.
7. Repairing casing leaks.
8. Consolidation of loose sands.
9. Multiple zone testing.

In repairing cement failures the problem of properly conditioning the annular space between the drill hole and the casing is important. In effect, the strength of a vertical seal behind a pipe is dependent upon the strength of the cement, mud cake, and plastic in place. A failure of any one of these materials will break the seal. Therefore, it is important that weak materials such as mud and contaminated cement be removed. For removing these weak materials, certain solids with good scouring and bridging properties have been developed and used successfully. In application, these scouring solids will suspend in a carrying fluid and can be pumped into existing channels. This restricts the flow in these channels and continued pumping creates a higher differential in pressure across the annular space between the pipe and bore hole. This action tends to force an opening through any remaining potential channel. Any new channel created will be bridged, and it is possible to pressure test the whole system with a higher differential pressure than ever will be placed on the system during production. When this optimum differential pressure is reached, liquid filler plastic is moved into place to effect the final seal.

Oftentimes it is desirable to completely block off certain completion intervals. This is accomplished by suspending bridging materials in mud. The mud seals a flow channel between the bridging solids reducing the injection to zero. The results are important in that oil and gas zones have been temporarily sealed without loss of large quantities of mud or water so that remedial work can be performed without damage to the original production of the zone which is blocked off. Such method has been used extensively in wells where limestone has been acidized.

Listed are brief descriptions on the present methods for applying liquid filler plastics.

Dump-bailer method.—(See Fig. 1) —To provide proper dumping a bailer of special design is used. When the bailer is set on bottom, a piston plunger forces the plastic out through an exhaust port at the bottom of the tool. At the same time, through a top port hole, well fluid enters, equalizing the pressure across the piston. The piston, after displacing the plastic, locks itself in place and prevents any pumping action when the bailer is lifted off bottom after releasing the liquid plastic.

Occasionally repeated dumps are necessary before the original plastic has set. In such cases a tail pipe is added, thus allowing the bailer to dump off bottom without disturbing the plastic on the previous dumps.

It is common practice to apply pressure by the bradenhead after the liquid filler plastic has been dumped and the bailer withdrawn from the hole. For this work, special equipment has been designed to mix the plastic, run the bailer, thief the liquid plastic in order to determine the amount of fill-up, and to apply pressure at the bradenhead.

Tubing squeeze method.—Tubing displacement and bradenhead squeeze is the most simple procedure used where low formation pressures are known to exist. Even so, this method under the best of conditions is seldom recommended, due to lack of control.

Tubing squeeze with drillable packer is one of the more popular methods. This setup requires the use of specially designed circulating jars in order to facilitate the use of rubber tubing plugs which precede and follow the filler plastic down the tubing. The use of a lead plug, commonly referred to as the No. 1 plug, is essential in order to prevent contamination of the plastics with lighter-weight fluids such as water or oil. These lighter-weight fluids are used to break down and wash the formation ahead of the plastic. This plug is pumped through the packer and left in the hole, then subsequently drilled up, if and when the packer is drilled out. The No. 2 plug which follows the plastic has an alloyed lead ball attached to the upper end. This plug, which has four wiper cups, seats itself in the body of the packer, thereby indicating that the plastic is in place. At this point the tubing is backed off and retrieved from the hole while the plastic is hardening.

In the event it appears desirable to stage squeeze, a specially designed tool is run in on tubing just above the circulating jars. This tool catches the No. 2 plug after the plastic has been squeezed out, at which time the circulating jars are opened and the No. 2 plug reversed out of the tubing to the surface prior to performing the second stage. During each stage the No. 1 or lead plug is pumped completely through the packer. Where a long completion interval is being squeezed and drilling mud is used as a fluid, it is desirable, but optional to the operator, to use drillable tail pipe below the packer for washing the area to be squeezed.

Tubing squeeze with retrievable packer is also popular with many oil operators. Two methods are being used, namely:

When relatively short intervals are being squeezed a 5-ft. joint of drillable tail pipe is run below the packer in order to facilitate washing the formation. The packer is then set at a desired point above the completion interval and the plastic is squeezed down across the perforations. Soon after the plastic has been squeezed the packer is released and retrieved. Here again rubber plugs are run to segregate the fluids.

When comparatively long intervals are to be squeezed regular tubing tail pipe is run before the packer. The length of the tail pipe is determined by the volume of plastic being used on the particular job. In conjunction with this method a four-plug landing tool is run above the packer. When using this procedure the entire quantity of plastic is displaced from the bottom of the tail pipe upward to a point above the top of the completion interval, which is a safe distance below the packer. The packer is then picked up to a predetermined point which clears the tail pipe above the liquid filler plastic. Following this, the packer is set and a desired quantity of the plastic is squeezed out. The packer then is released and pulled from the hole.

Setting liners with plastic.—(See Fig. 2)—The setting of blank liners with plastic for the purpose of shutting off excess gas and water, or for zone segregation, has been most successful. This operation is relatively simple in that it requires the minimum of bottom-hole equipment. The blank liner is run into the hole on tubing, with both the tubing and liner attached to a simplex liner set shoe which is specially designed for use in plastic operations. Two rubber tubing plugs are used in this work for fluid segregation in a similar manner to that discussed in the foregoing part of this paper.

When the No. 1 lead plug passes through the liner shoe a differential in pressure is created, which pressure is recorded on the surface. At this point the volumes are accurately measured until the plastic reaches the top of the liner. By using a surplus of liquid filler plastic with limited penetration qualities a sustained casing pressure can be maintained while moving the No. 2 plug into place in the liner set shoe. This plug serves as a back-pressure valve, holding the plastic in the annulus between the blank liner and the well bore. The tubing then is backed off the shoe and any excess plastic which may have spilled over the top of the liner is reversed out, leaving a clean liner for completion.

Setting casing. — The placing of plastic as a cementing medium is performed in exactly the same fash-

ion as if cement were used. A special plug is employed ahead of the liquid plastic so that when it lands on the float collar a diphragm shears, thereby allowing the plastic to pass through the plug and casing shoe. The No. 2 plug which follows the plastic accomplishes a shut-off when all the plastic has been displaced.

Zone abandonment, setting of bridge plugs and repair of casing leaks are handled by either the dump-bailer or tubing methods, described in the foregoing techniques.

Sand consolidation is done exclusively through the use of drillable or removable packers. (See Fig. 3). This is essential because the sand-consolidating plastic possesses a specific gravity of 0.97 which is lighter than water and some oils, and, once squeezed into place, should not be disturbed while hardening.

In multiple-zone testing it is often advantageous to block out tested zones so that the productivity of another zone can be accurately determined. The use of plastic in this method of testing has merit in that less time is required to complete each test. The proper tool hookup is to run a plug catcher above the bit. Plastic then can be spotted, and bradenhead squeezed.

By reversing the plugs out, the hardened plastic can be drilled out and pump tested in 4 to 6 hours without making a trip. The process can be repeated as soon as another undesirable zone is encountered.

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Natural Gas Potentially Rich Source of Synthetics

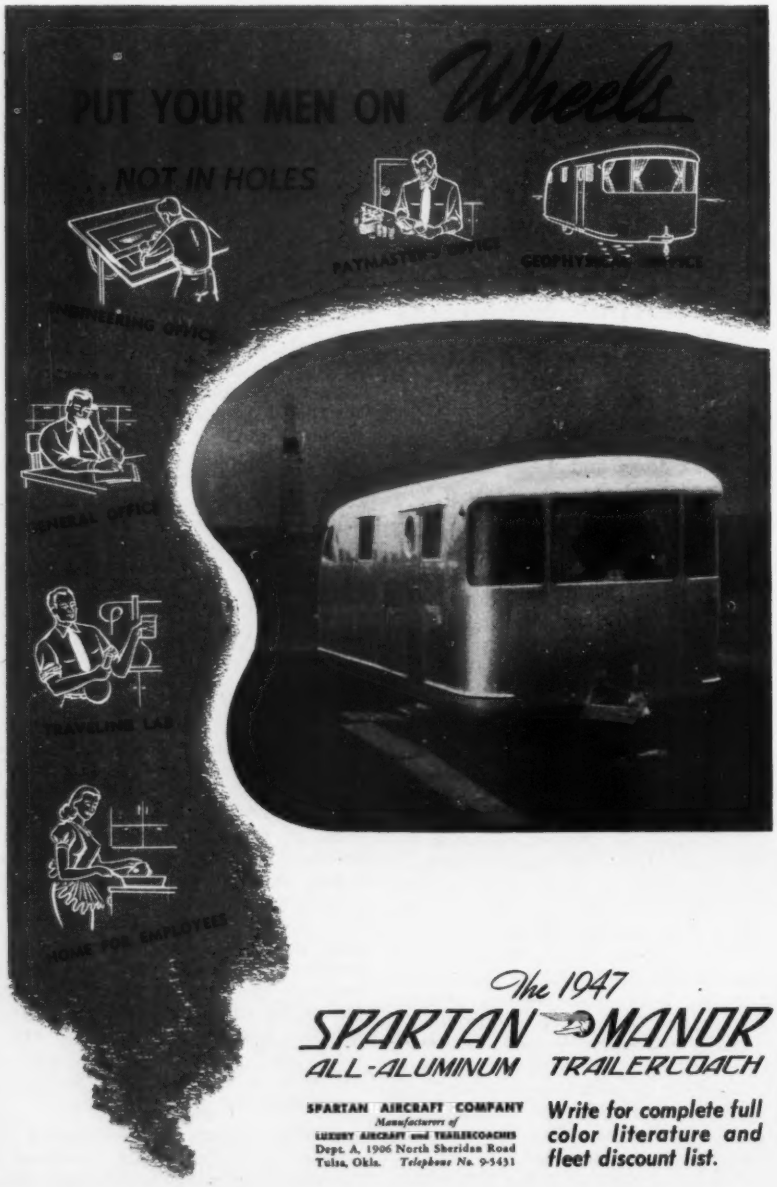
BARTLESVILLE, Okla.—Comparatively recent technologic developments in the use of natural gas for purposes other than for direct fuel and energy have uncovered an important potential raw material source for hundreds of synthetic products, the Bureau of Mines reported today in a new publication.

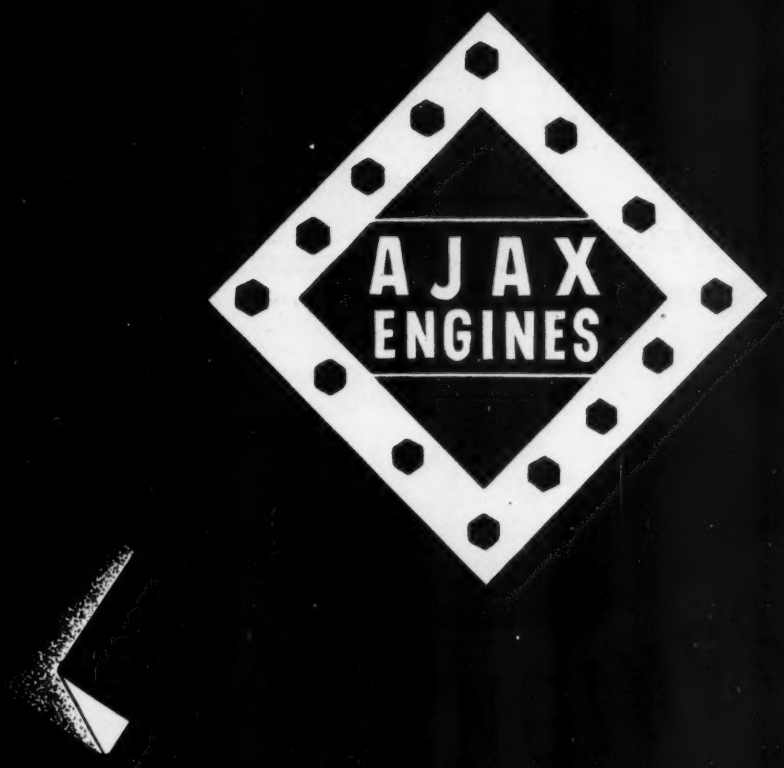
The number of products obtainable from natural gas already is large and the relative cheapness and availability of natural gas indicate that the range of products will continue to grow. As an indication of the further expansion of industries drawing on natural and refinery hydrocarbon gases for raw materials, many wartime plants and processes were rapidly converted to peacetime activities and new plants were blueprinted for postwar construction.

Of the more than a dozen methods for converting natural gas to other compounds, decomposition, by pyrolysis, or electrical discharge, is considered among the most important, according to the authors of the Bureau report, Harold M. Smith and W. C. Holliman, petroleum chemists at the Bureau's petroleum experiment station at Bartlesville.

Products obtained by this method are shown in chart form along with similar charts of materials resulting from oxidation, halogenation, nitration, and sulfurization. Additional charts deal with the composition of natural gas, consumption of natural gas and production of some organic chemicals since 1936, composition of petroleum and relationship and sources of petroleum-type hydrocarbons, methods for conversion of petroleum hydrocarbons, and use of nonhydrocarbon constituents of natural gas.

A free copy of the publication, Information Circular 7347, "Utilization of Natural Gas for Chemical Products," may be obtained by writing to the U. S. Bureau of Mines, Department of the Interior, Washington 25, D. C.





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Specially Designed Workover Barges

(Continued from page 63)

tion of the larger motor on the barge with the higher derrick made the two units about equal.

Special Transmission

There is a special two-speed transmission between the engine and pump on this barge designed to the specifications of Texas Co. engineers. As pointed out by R. B. Edmonson, Texas Co. district engineer at Houma, this transmission permits the development of higher pressures at reduced volumes—a feature essential on workover jobs. Without a transmission of this kind, according to Edmonson, an engine of two and a half times the horsepower as installed would have had to be used.

The 6-in. self-priming centrifugal pump installed on this barge is for pumping out ballast water, and will unload the barge in approximately 1 hour. In addition to pumping out the barge, this pump is used to furnish water during cementing operations.

Separate Fresh-Water System

In accordance with an efficient and proven operating practice, a separate fresh-water system is used on the barge. A volume tank of approximately 28 bbl. is located on the upper deck and the arrangement of the piping is such that this tank furnishes fresh water to the hydromatic brake. This water is returned to the tank by gravity. Also in the hull of the barge is a reserve fresh-water compartment which takes care of any emergency and makes it unnecessary to use salt water in any of the barge equipment.

All engines on the barge are equipped to run on gas or gasoline. Gasoline tanks are a part of the small engines. The large engines are supplied from a main tank with suitable piping, but gasoline is used only in an emergency or when the barge is on an isolated location.

The gas system has been so arranged that all units operate from a main gas system equipped with two volume tanks and three regulators. One regulator is used to reduce the gas from lease pressure down to between 15 and 20 lb. into one tank. From this tank, it is reduced into the second tank to from 8 to 10 oz. The regulators are installed between the two tanks, one for continuous and one for standby service. By such a system, a saving in regulators was accomplished. One regulator takes care of the entire system which otherwise would have required a separate regulator to each engine.

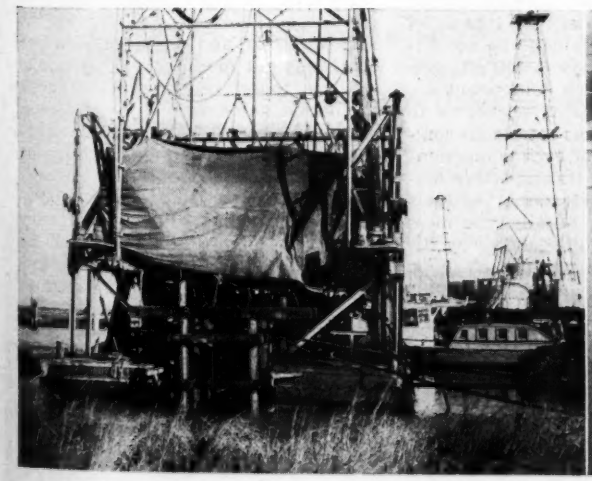
Suspended Pipe Rack

One of the most unusual features of the workover barge is the suspended pipe rack. Due to limited barge space and scope of work required, a conventional pipe rack could not be provided in the design. Therefore, a suspended pipe rack was installed, which is hinged to the barge on one end and suspended from a cable on the other end. This pipe rack is 30 ft. long and is used for fishing tools and making up well setting. When the barge is engaged in work at a location where there is a permanent pumping foundation, the pipe rack is raised. On long moves it is strapped to the derrick.

Novel Design of Derrick Floor

The derrick floor on these workover barges has been designed in such a manner that it is at the correct operating level for working in relation to the rotary. In this manner, no false floor is required. The part of the floor covering the slot is made in two removable sections. Each section is of the proper length and can be removed so that that part of the slot has a floor, depending upon which type of well-completion platform the barge happens to be working on. This arrangement speeds up the over-all operations when moving on or off locations.

Location of mud ditch, showing protection against waves



Left: Slot end of barge showing cribbing of well-completion platform. Right: Air view showing typical coastal Louisiana area where workover barges are being operated

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Relation of Reid to True Vapor Pressure

I am unable to locate anything in any publication of the oil and natural-gasoline industries which throws any light on how to calculate the percentage of 26-lb. gasoline contained in a gasoline of another vapor pressure. A sample computation would be of great value to me and probably many others. Included is an average analysis of a natural-gasoline product along with the Reid vapor pressure obtained. I would like to utilize all of the pentanes and heavier and such normal butane necessary to make up the required 26 lb. The liquid-volume analysis is as follows: propane 2.2 per cent, isobutane 27.8, butane 33.2, isopentane 12.7, pentane 9.1, hexane plus 15, gravity of hexane plus 0.7093, molecular weight of hexane plus 96, and Reid vapor pressure 43.1.—D. D. E.

The Reid test involves the vaporization of a small amount of the liquid into the vapor space of the bomb. Thus, the kind of liquid that is left behind depends upon the composition of the original liquid. If the sample contains a small amount of the lightest component (such as propane in a natural gasoline), the vapor pressure of the liquid that remains after vaporization takes place will be much lower than that of the original liquid. For this reason, each sample behaves differently from other samples and there can be no exact factor by which Reid vapor pressure can be converted to true vapor pressure.

However, when the Reid method of test was adopted, a number of tests were made (Oberfell, Alden, and Hepp, "Comparison of Vapor Pressure Testing Methods," eighth annual meeting of A.P.I., 1928), and these indicate in general that the true vapor pressure is 5 to 9 per cent higher than the Reid vapor pressure. An average percentage of 7 is widely used.

To convert R.v.p. to t.v.p.—Multiply by 1.05 to 1.09.

To convert t.v.p. to R.v.p.—Multiply by 0.917 to 0.952.

The easiest way to estimate the yield of 26-lb. gasoline is to resort to a composition chart such as that distributed some years ago by Refinery Supply Co. of Tulsa, and reproduced on page 552 of the second edition of Petroleum Refinery Engineering (McGraw-Hill Book Co., Inc., New York, 1941). This chart and other sources indicate that the approximate mixed butane content of gasoline is:

R.v.p.	Per cent off at 140° F.	Per cent butanes
14	20	14
18	50	18
22-55 grade	..	15-24
26-70 grade	..	24-23
30-70 grade	..	33-42

Thus, a 26-lb. gasoline will contain about 130 per cent of mixed butanes and 70 per cent isopentane plus.

Example 1.—The gasoline of the question contains:

	Per cent
isopentane	12.7
pentane	9.1
hexane plus	15.0
isopentane plus	36.8

If the isopentane plus is 36.8 per cent, the total yield of 26-70 gasoline will be approximately:

$$\frac{36.8}{0.7} = 52.5 \text{ per cent}$$

Of the 52.5 per cent, mixed butanes would be 15.7 per cent. This would be taken from the 27.8 and 33.2 per cent available in the unstabilized gasoline.

	Per cent on raw gasoline	Per cent on 26-lb. gasoline
butane	15.7	30.0
isopentane	12.7	24.2
pentane	9.1	17.3
hexane plus	15.0	28.5
	52.5	100.0

True vapor pressure is computed by multiplying the mol fraction of each component by its vapor pressure at 100° F. The sum of the partial vapor pressures is the true vapor pressure.

Example 2.—The analysis stated in the question must be converted from liquid volume per cent to a basis of mol per cent. This is done by considering the sample to be a 100 ml. one. The milliliters of each component are multiplied by its specific gravity to determine the grams of each component. The grams of each component are then divided by its respective molecular weight to determine the mols of each component. Finally, the mols are put on a percentage basis by dividing by the total number of mols. All of this is shown in a tabular form:

Component—	Liquid vol. per cent	Sp. gr.*	Gm. per 100 ml.	M.W.	Mols.	Mols. per cent	Mol. fraction
propane	2.2	0.5089	1.12	44	0.0254	2.73	0.0273
isobutane	27.8	0.5665	15.75	58	0.2720	29.17	0.2917
butane	33.2	0.5824	19.35	58	0.3340	35.85	0.3585
isopentane	12.7	0.6241	7.92	72	0.1100	11.80	0.1180
pentane	9.1	0.6306	5.74	72	0.0797	8.55	0.0855
hexane plus	15.0	0.7093	10.62	96	0.1109	11.90	0.1190
	100.0				0.9320		1.0000

*Taken from page 114 of the Second Edition of Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., 1941.

The true vapor pressure of the gasoline can be computed by means of the following tabulation:

Component—	Mols.	V.P. psia.	Partial vapor pressure
butane	x	52	52x
isopentane	0.1100	20.3	2.23
pentane	0.0797	15.5	1.24
hexane plus	0.1109	*1.63	0.18
	(0.3006 + x)		(3.65 + 52x)

*M.W. of 96 indicates a vapor pressure over 2.0 whereas the gravity of 0.7093 indicates about 0.5. The nearest hydrocarbon is normal heptane and it has a vapor pressure of 1.63.

The true vapor pressure of 26-R.v.p. gasoline would be approximately:

$$26 \times 1.07 = 28.7$$

And in terms of the tabulation given above:

$$\frac{3.65 + 52x}{0.3006 + x} = 27.8$$

$$x = 0.195$$

This can be put back on the liquid volume basis of Example 1 (as a check) by means of another tabulation:

	Mols	Grams	ml.	Liquid vol. per cent
butane	0.1950	11.3	19.4	34.5
isopentane	0.1110	8.0	12.7	22.6
pentane	0.0797	5.7	9.1	16.2
hexane plus	0.1109	10.6	15.0	26.7
			56.2	100.0

This analysis and yield of 56.2 per cent does not check the approximate analysis found in Example 1, but it should be noted that this analysis is based on **normal butane** as the low-vapor-pressure component whereas the analysis of Example 1 was based on a mixture of iso and normal butane such as that which would ordinarily be produced in a gasoline plant. Considering the use of pure normal butane, this computation appears to be a good check with Example 1.

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Location and Spacing of Wells On Elongated Reservoirs

OIL PRODUCTION by water

PART 20 OF A SERIES

THE characteristics of the E-1 reservoir given in Part 19 are used here to illustrate the optimum location and spacing of producing and injection wells on elongated reservoirs. The smaller the ratio of minor to major axes, the greater the tendency for water to reach producing wells via minor semi-axes unless offset by gravity and the proper location of producing and injection wells.

This is the final article in the series on Oil Production by Water.

*by Park J. Jones**

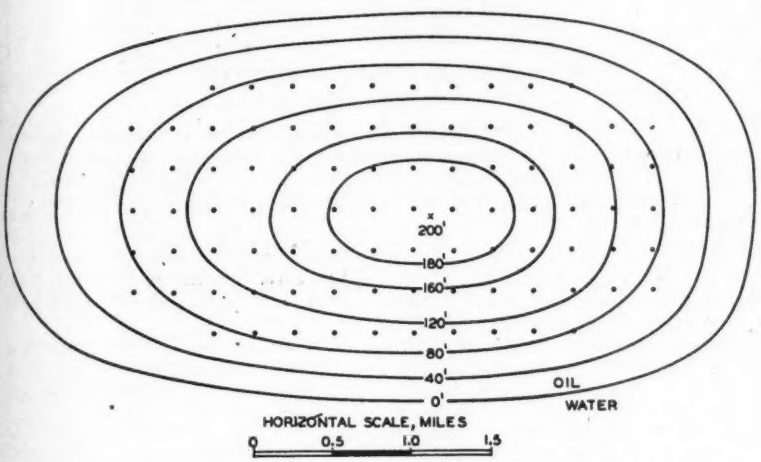

Fig. 20-1—One hundred 40-acre locations and contours on top of pay in E-1 reservoir

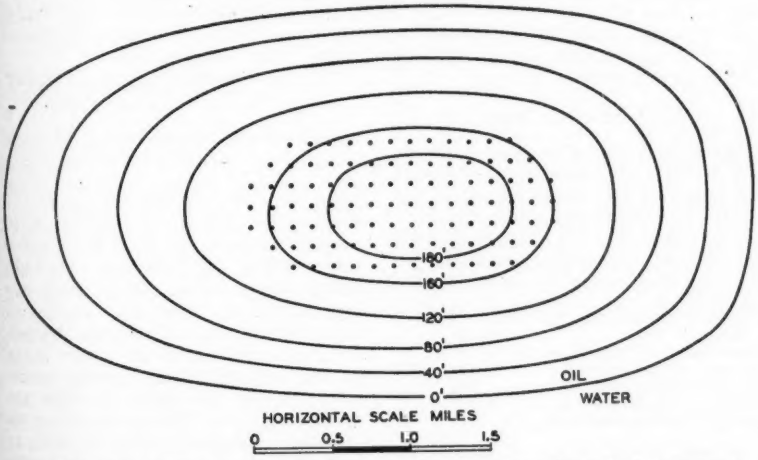

Fig. 20-2—One hundred 10-acre locations and contours on top of pay in E-1 reservoir

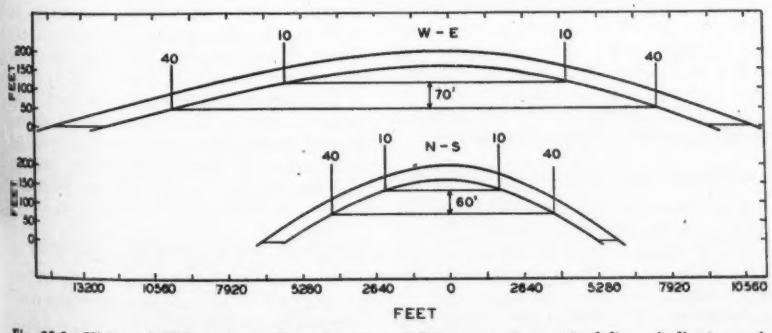

Fig. 20-3—W-E and N-S sections through apex of E-1 reservoir; vertical lines indicate position of structurally lowest wells; 40 is for 100 40-acre wells; 10 is for 100 10-acre wells

Ten and Forty-Acre Locations

ONE HUNDRED regularly spaced 40-acre locations for the E-1 reservoir are shown in Fig. 20-1. Six of the locations are on the downdip side of the 80-ft. contour.

One hundred regularly-spaced 10-acre locations are mapped out in Fig. 20-2. Eight of the locations are on the downdip side of the 160-ft. contour.

Fig. 20-3 contains W-E and N-S sections through the apex of the E-1 reservoir. The vertical lines "10" indicate the position of the structurally lowest 10-acre wells. The vertical lines "40" indicate the position of the structurally lowest 40-acre wells. The horizontal lines show a 65-70-ft. difference in elevation between the structurally lowest 40-acre and 10-acre locations. The 65-70-ft. higher structural position is in favor of 10-acre spacing.

Number of Wells vs. Time

The pay thickness is 40 ft. for the area not having bottom water. But a rise in the elevation of the oil-water interface decreases the area not having bottom water.

The number of 10-acre and 40-acre wells which can be completed in 40 ft. of pay above water are plotted against time in Fig. 20-4. One hundred 40-acre wells can produce about 6 years before the structurally lowest wells are invaded by water. However, 100 10-acre wells can produce about 19 years before the structurally lowest wells are invaded by water. The 19/6 or 3 : 1 life ratio for producing dry oil is in favor of 10-acre locations.

Number of Wells vs. Cumulative Recovery

The number of 10-acre and 40-acre wells which can be completed in 40 ft. of pay above water are plotted against cumulative recovery in Fig. 20-5. One hundred 40-acre wells can

*Production consultant, Houston.

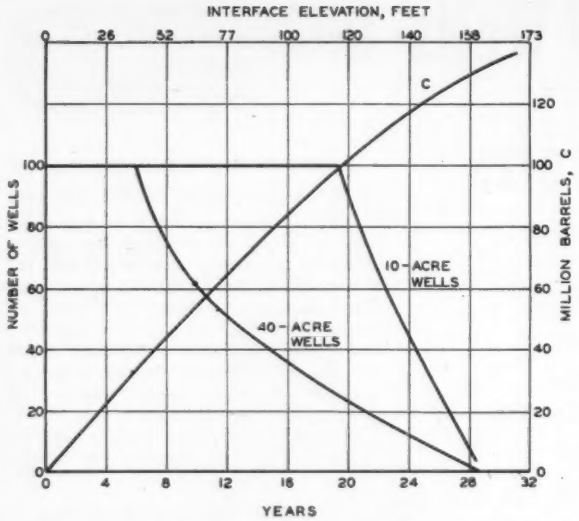

Fig. 20-4—Number of 10-acre and 40-acre wells completed in 40 ft. of pay and cumulative recovery vs. time for E-1 reservoir

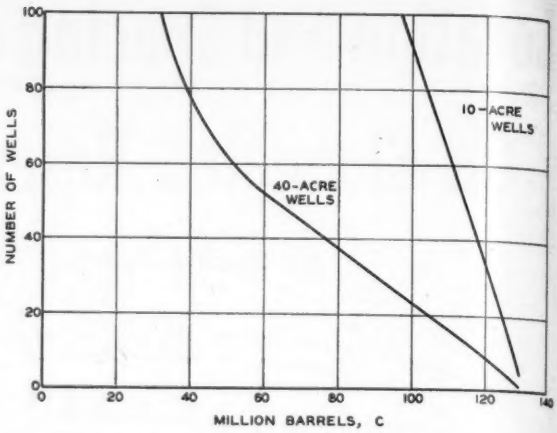

Fig. 20-5—Number of 10-acre and 40-acre wells completed in 40 ft. of pay vs. cumulative oil recovery from E-1 reservoir

accumulate about 32 million barrels of oil before the structurally lowest wells are invaded by water. However, 100 10-acre wells can accumulate about 97 million barrels before the structurally lowest wells are invaded by water. The 65 million barrels difference is in favor of 10-acre locations.

Spacing vs. Pressure Difference

The initial pressure difference between the source of water and the minimum bottom-hole flowing pressure is less for 100 40-acre wells than for 100 10-acre wells. But after some 40-acre wells are invaded by water, the pressure difference requirements are in favor of 10-acre spacing. For instance, when the cumulative recovery is 60 million barrels, the number of 40-acre wells is 52 whereas the number of 10-acre wells completed in 40 ft. of pay is 100. When cumulative recovery is 97 million barrels, there are twenty-five 40-acre wells completed in 40 ft. of pay whereas the number of such 10-acre wells is 100. The well-feet of completion in pay increases progressively in favor of the 10-acre locations.

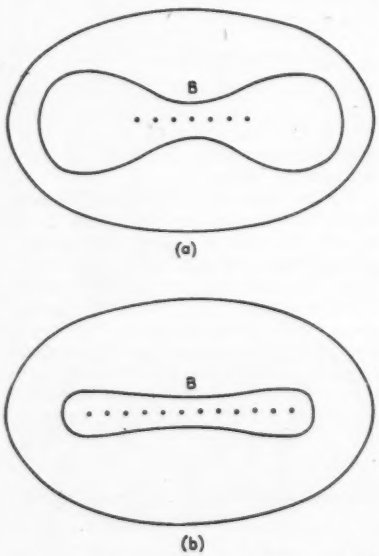

Fig. 20-6—Illustrating approximate position of a B contour in an elongated reservoir for no sectional convergence and no gravitational migration; wells are uniformly spaced along one row

The Load on Wells

The initial rate of production is 14,800 bbl. per day for a MER of 200 ft. per year. When the cumulative recovery is 97 million barrels, the MER is 11,500 bbl. per day. If well capacity were equal to reservoir capacity the per-well load would be as follows:

Cumulative recovery, million barrels	None	97
Producing rate, barrels per day	14,800	11,500
Number of 10-acre wells	100	100
Average barrels/day/well	148	115
Number of 40-acre wells	100	25
Average barrels/day/well	148	460

Exclusive of wells invaded by water, the load on 40-acre wells increases progressively from 148 up to 460 bbl. per day. Whereas, the load on 10-acre wells declines from 150 down to 116 bbl. per day. These data are for the first 19 years in the life of the E-1 reservoir produced at MER without coning or fingering water.

Displacement of Water by Gravity

Fig. 20-3 shows that the distance from water to structurally lowest wells is much longer along the major axis than along the minor axis. For this reason, we wish to show the effectiveness of gravity for displacing water.

Let A be area in acres between top and bottom of pay in a horizontal plane. For instance, the area A at the zero level in the E-1 reservoir is 1,570 acres; at the 40-ft. level, 1,440 acres; and at the 80-ft. level, 1,240 acres.

The rate of water displacement q by gravity in barrels per day in a direction parallel to bedding is defined[1] by

$$q = 21{,}250 \frac{AK\Delta S}{\mu} \sin^2 D \quad (1)$$

where

K = permeability to water, darcys
μ = viscosity of water centipoises
D = dip, degrees
ΔS = difference in specific gravity, (water — reservoir liquid).

As an example let K = 1; μ = 1; ΔS = 0.3; A = 1. Then

$$q = 6{,}375 \sin^2 D$$

The dip in the vicinity of the 80-ft. contour near the center of the N and S sides of the E-1 structure averages 42.6 ft. per thousand. The sine of this dip is 0.0425. The rate of fall is 6,375 $(0.0425)^2$ or 11.5 bbl. per day per acre. For 500 acres of water above oil, the rate of fall by gravity would be 5,750 bbl. per day provided the permeability to water were equal to 1,000 md. Evidently, gravity tends to maintain migration of fluids parallel to strike. The direction of migration is from major to minor semiaxes in four quadrants of the E-1 reservoir. Other things equal, the rate of displacement is proportional to the acres, A, through which water is falling. The area A varies with structural position and with the difference in elevation between locally elevated water and the water not pulled, or pushed, across contours.

Rate of Advancement by Gravity

The rate of advancement of water by gravity V in feet per day parallel to bedding is defined[1] by

$$V = 2.74\, K\Delta S\, (\sin D)/f m\mu \quad (2)$$

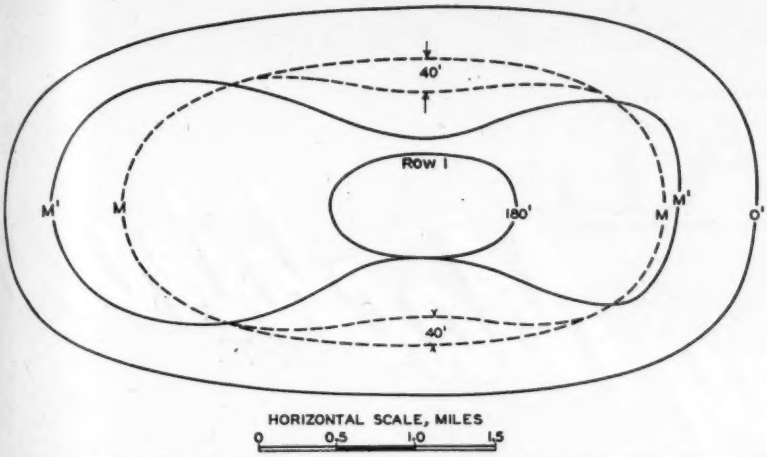

Fig. 20-7—Illustrating approximate position of M contour at 80-ft. level in E-1 reservoir; M' is a possible position aside from gravity; M is probable position with gravity; inside dashed contours show possible position for M elevated 40 ft. on the minor semiaxes

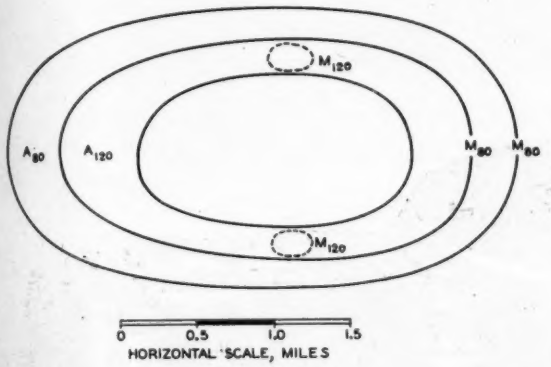

Fig. 20-8—Showing area in a horizontal plane at 80 and 120-ft. levels in E-1 reservoir; dashed contours show a possible area of M contour in the 120-ft. level

where m is the fraction of porosity occupied by moving water. As an example let K = 1, μ = 1, ΔS = 0.3, sin D = 0.0425, f = 0.25 and m = 0.6. For this condition gravity is pulling water down at the rate of 0.23 ft. per day parallel to bedding. If the effective permeability to water were 100 md., the rate of water fall would be about 0.023 ft. per day. For low permeability, and for high permeability but low water saturation, the rate of water fall by gravity is very slow.

The rate of water advancement for a MER of 200 ft. per year along the top of pay is 0.548 ft. per day. The rate of water advancement by gravity along a B contour is zero. The effective permeability to water at breakthrough saturation is practically negligible. The rate of water advancement within a B-M region increases from zero along B up to some maximum value along, and below, the M contour. Gravity does not displace water along a B contour. However, the position of a B contour is influenced by gravitational migration of fluids downdip from a B contour.

Position of the B Contour

Suppose the rate of water encroachment, or injection, across a zero-oil contour, water contact, is uniform per unit length of contour. The pressure gradients between a first row of wells and the water contact would be inversely proportional to the distance between the row and the water contact. The greater the distance, the smaller the pressure gradient. In addition, the distribution of pressure gradients would be inversely proportional to strike length. The shorter the distance along a contour within a given sector, the higher the pressure gradient along that contour.

The distribution of pressure gradients for a uniform rate of displacement within a given sector also varies with (1) sectional convergence of pay, (2) differences in viscosity between a reservoir liquid and water, and (3) variations in effective permeability. A mixture of reservoir liquid and water has a lower effective permeability than reservoir liquid alone. This tends to be offset when the viscosity of water is less than that of a reservoir liquid. The mapping out of the exact position of a B contour is complicated. In order to illustrate gravitational migration of fluids in elongated reservoirs, it is assumed that the position of a B contour is proportional to the square of distances between the source of water and a first row of wells for no gravitational migration.

The sketches in Fig. 20-6 are illustrative examples. In the upper sketch, the acre-feet of pay not invaded by water at the time of impending breakthrough is significant. In the lower sketch, premature breakthrough along the minor semi-axes is minimized. The illustrations are relative to no variation in pay thickness, viscosity, permeability and aside from gravity.

Position of the M Contour

Gravitational migration will now be illustrated with the aid of Fig. 20-7. Producing wells are located within the 180-ft. contour. The M' contour is the estimated position of maximum recovery aside from gravity and on the square of distance basis. With gravity, the probable position of maximum recovery is shown by the dashed contour. The data are for the 80-ft. level in the E-1 reservoir. If the elevation of the section of maximum recovery were at the 120-ft. level along the semi-minor axis, there

(Continued on page 92)

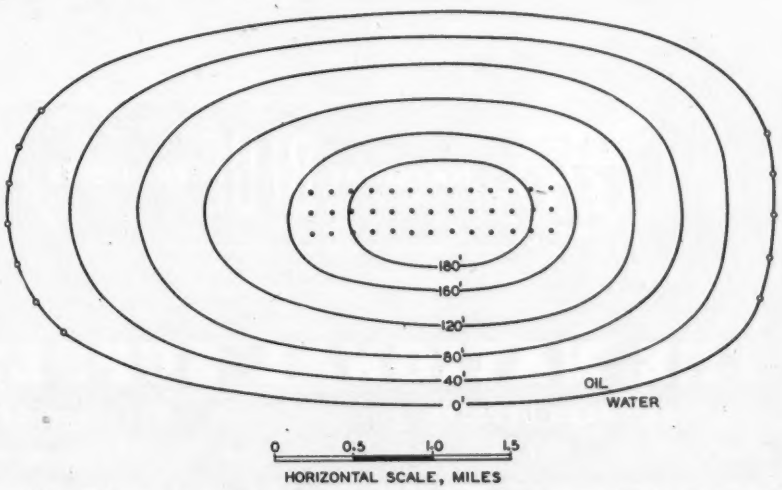

Fig. 20-9—Showing contours on top of pay, 39 producing wells spaced 660 ft. and 12 injection wells spaced 1,320 ft. along water contact of E-1 reservoir

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THE TYPE FE-17

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- AUTOMATICALLY INDUCED OIL LUBRICATION FOR MAIN BEARINGS AND GEARS
- PRESSURE GREASE LUBRICATION FOR PINION SHAFT
- SEALED AGAINST INTRUSION OF MUD AND FOREIGN MATTER
- PINION SHAFT LOCK WITH CONVENIENT OPERATING GRIPS
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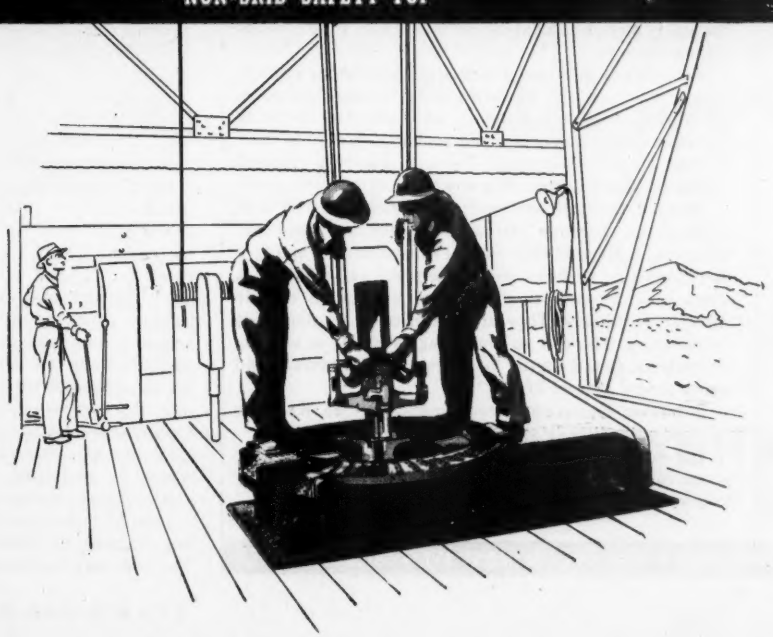

would be a 40-ft. head tending to displace water by gravity. The inside dashed contour shows a possible position for M elevated 40 ft. on the minor semiaxes.

A barrel of reservoir liquid is displaced by gravity for each barrel of water falling through such areas as A_{30} in Fig. 20-8. The M contour tends to parallel structural contours. The water displaced by gravity slows up the advancement of a B contour. The oil displaced by gravity does not advance a B contour. The position of the M contour controls the position of its B contour. Hence, the position of a B contour is about 1,000C updip from the M contour. Consequently, a B contour tends to parallel structural contours.

However, the excessive pressure gradients in the vicinity of well bores can pull in water as in coning and fingering. Localized pressure gradients pull a B contour across structural contours. When pressure gradients are unusually high, an M contour is also pulled in across structural contours in localized regions as, for example, the M_{120} contour in Fig. 20-8.

The Optima for the E-1 Reservoir

The MER for the E-1 reservoir is 14,800 bbl. per day. The initial rate of depletion is only 3.7 per cent per year. But the rate of depletion relative to one oil-water interface increases up to 6 per cent per year in about 12 years. On the other hand, the increase in cost for splitting the E-1 reservoir so as to produce at the rate of say 30,000 bbl. per day initially, is likely to be greater than the interest earned by the additional 15,000-bbl.-per-day rate. The present value of the 148 million barrels of recoverable oil produced with one oil-water interface is likely to be greater than if it were produced with three interfaces. If the E-1 reservoir were split into three producing units, the volume of water which would have to be produced would be large by comparison with the volume of water which has to be produced relative to one interface. A faster producing rate is not likely to pay for the cost of producing the additional water. These statements can be verified by comparing the present value for, say, a 30,000-bbl.-per-day initial producing rate relative to three interfaces with the present value of the 14,800-bbl.-per-day rate for one interface in the E-1 reservoir.

Fig. 20-9 shows the optimum locations for 39 producing wells and 12 injection wells. All producing wells are within the 160-ft. contour. The distance between these wells is 660 ft. The load on the wells is 14,800/39 or 380 bbl. per day. If well capacity averages more than 380 bbl. per day per well, less than 39 wells are required.

Total water requirements are 14,800b bbl. per day where b is the volume factor for oil. Twelve injection wells are shown in Fig. 20-9. For 50 per cent water encroachment, the load on 12 injection wells would average 7,400b/12 or 620b bbl. per day per well. The distance between injection wells is 1,320 ft.

Reference

1. The Oil and Gas Journal, April 28, 1945, p. 124.

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Is Corrosion Taking $ $ From Your Pocket?

(Continued from page 71)

uary 2, 1946. In the midst of a period of severe corrosion, the chemical treatment proved its worth by giving the operator over 2 months of uninterrupted operation.

Manner of Application

Manner in which the inhibitor is applied is illustrated in Fig. 3. It is diluted with water and lubricated into the annulus between the tubing and the casing from a reservoir capable of withstanding the well pressure. A typical installation is shown in Fig. 4.

For best results the initial treatment should be sufficient to coat fully all metal surfaces exposed to the fluid being produced. An initial dosage of 5 gal. per 1,000 ft. of depth is recommended to insure full coverage of the casing, outside and inside of tubing, rods, and pump. Dilute each gallon of chemical with 4 to 5 gal. of water. Run in the entire amount as rapidly as possible to allow the solution to reach bottom rather than adhere to the wall higher up in the hole. Whenever possible on the first application, tie the tubing and casing together and circulate the well to secure thorough coverage of all metal parts.

Wells equipped with packers require installation of a macaroni string outside the tubing to permit entrance of the solution under the packer. A special packer will be required and only in extreme cases of corrosion will the expense be warranted.

On flowing wells introduce the diluted solution into the annulus and allow sufficient time for the solution to reach bottom. The well should then be flowed through the tubing until an amount of oil equal to the tubing capacity plus the oil in the annulus has been produced. The well should then be shut in for a few hours after which normal production may be resumed. If the well has a high fluid level, dilute the required amount of chemical with enough water to overcome the static head to insure its reaching bottom.

The film now established must be maintained by periodic applications. The amount required is variable, de-

pendent on the type and amount of corrosion, presence of corrosive gas such as hydrogen sulfide, amount and type of water being produced along with the oil, and the manner in which the well is being produced. For normal conditions experience has shown that approximately 2 qt. every other day is adequate. However, the amount is variable, and in some areas as little as one pint will prove satisfactory. The additions may be made every 2 or 3 days. In extremely corrosive areas, or where large volumes of water are being produced, it may be necessary to make daily or continuous-feed applications.

Electronic Micrometer Capable of Measuring Thickness of Paint Spot

MEASUREMENT of the thickness of a paint spot with the new electronic thickness gage developed by the National Bureau of Standards, Washington, D. C., is demonstrated by M. L. Greenough, bureau scientist who designed the new micrometer. Use is made of the magnetic-field distribution about a coil excited by high-frequency currents in the presence of a metallic plate. At the surface of the plate the field ideally is zero and increases to a maximum at the coil.

The voltage induced in a pickup coil indicates the separation of the small black cylinder containing the coils from the plate. The voltage is registered on the dial of the meter, which is calibrated, not in electrical units, but in thousandths of an inch. In addition to measuring thickness of paint or varnish, the electronic micrometer may be used to measure other insulators, such as oil films in lubricated metal bearings. (Readings have been found to be substantially independent of the dielectric constant of the material.) This principle is being applied in several other devices.

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Steam Power Plants

(Continued from page 74)

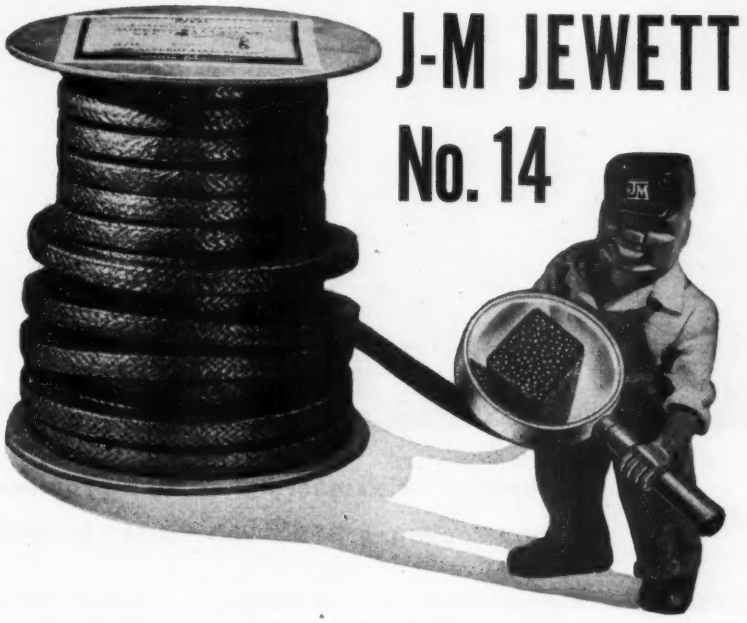
at $0.2248 per 1,000 lb., excluding depreciation. Average production for both plants, over a yearly period, is 40,000 lb. per hour, approximately. Each plant is equipped with four conventional - type horizontal - drum straight-tube boilers which are fired with a mixture of refinery and natural gas. Except for automatic feedwater regulation and continuous blowdown the boilers are not equipped with any accessories that are used generally to improve efficiency. However, the boiler plants meet the state and insurance company safety requirements for operating safety.

According to a condensed-type report all of the boilers in each of these two plants are operated at manufacturers' rating. When considering the reported volume of feed water delivered to the boilers and correcting for its temperature and for steam quality the boilers are actually operating around 115 per cent of rating. No means are available at either plant for determining the exact volume of feed water delivered to the boiler battery nor is there any way to measure steam and blowdown volumes. The reported figure for feedwater volume in each case is obtained by gaging a sump into which treated water is dumped from a batch-treating operation. Possibly this method of measuring feed-water volumes may average out to be reasonably accurate over a long period but for accurately determining per cent of rating under maximum or minimum demands, which are usually of short duration, the method is inadequate.

Feed-water conditioning equipment at each of the plants is standard make and all operations appear to be according to recommendations except that blowdown analyses are made at greater intervals than are found in general practice. Blowdown for these plants is for a 1-to-20 feed-water ratio as regulated by valve setting which valves are checked for accumulated deposits when the boilers are shut down for individual inspection. Scale formations in one battery of these boilers are relatively heavy but easily removed whereas the other plant's battery shows a moderately thick scale deposit that requires considerable time to remove. In either case, operating conditions indicate that plant efficiencies could be improved if treating procedures were altered. Due to the relatively low cost of conditioning nearly any type of water for boiler service, some refineries appear to be overlooking an opportunity to improve boiler-plant performances, at little or no additional cost, by neglecting this phase of their operations.

Most if not all of the companies supplying materials and equipment for treating or conditioning feed water offer cost-free services of their field men to the operators of industrial steam-generating plants. In a great many cases these men, specialists in their field, have improved a plant's efficiency, without additional cost to the operation by making minor adjustments in water-treating procedures.

The four boilers in each of these plants are normally in continuous operation and when meeting peak demands of the refinery they are estimated to be operating at 125-130 per cent of rating. Peak demands at the refineries, if continuous, would average out to 8 hours or one-third of an operating day, but the peaks are intermittent and irregular throughout a 24-hour period in one plant and in the daytime and evening shifts in the other. An investigation of operations over a 24-hour period may reveal that three boilers in each of the batteries will carry the peak loads efficiently. If such should prove to be true, the extra boiler would serve well in standby service. Although maintenance for these plants averages 2.63 per cent of total production costs more frequent inspections are made for the purpose of preventive maintenance instead of the current practice for safety purposes only.



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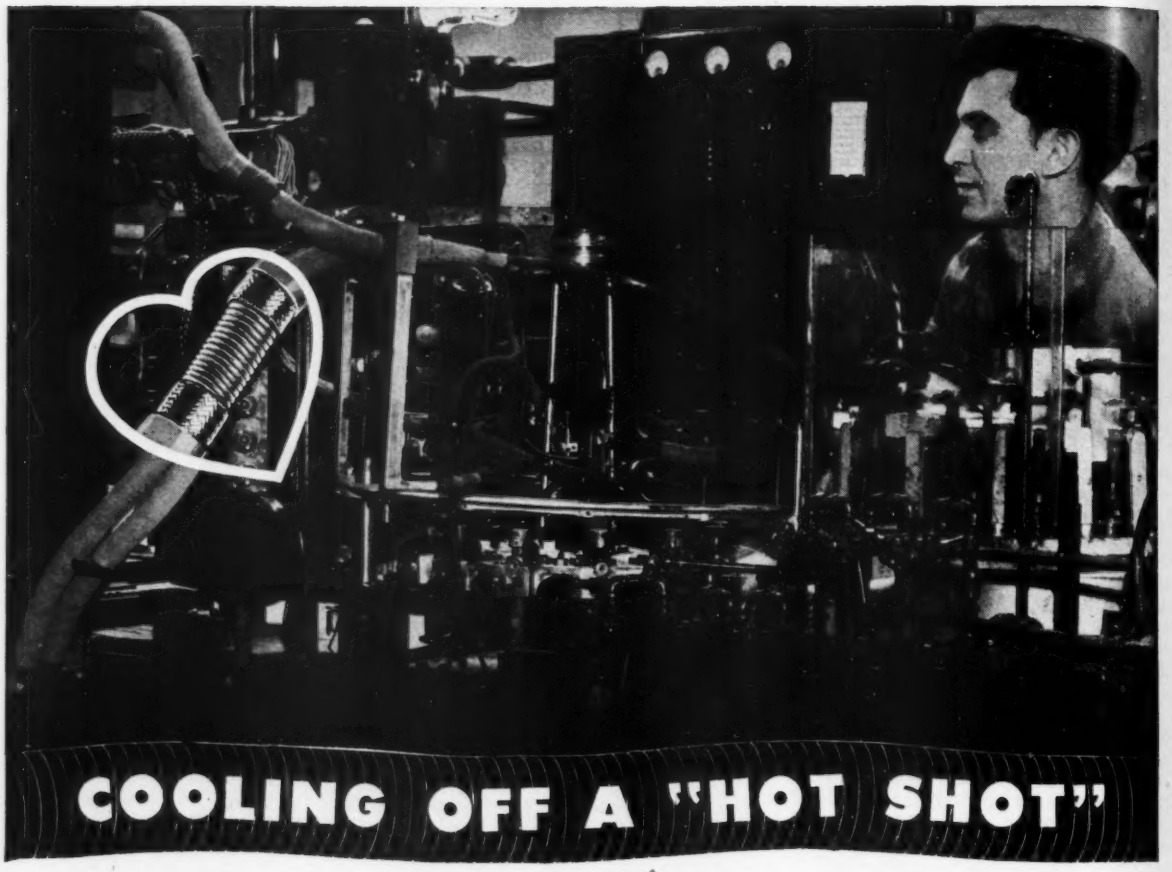

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MODERN Rotary DRILLING

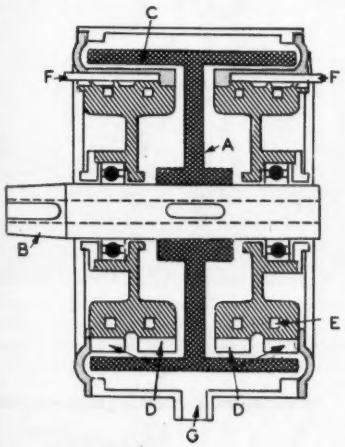
Electromagnetic Draw-Works Brakes

TWENTY installations of electromagnetic brakes are now in actual operation in California and the Mid-Continent. The oldest installation has been in successful operation for 2 years. Largest loads handled were in a well 16,361 ft. deep.

Principle

Fig. 21 shows a schematic arrangement of an electromagnetic brake. An iron drum is supported on a hub and a shaft. The shaft, rotating on frictionless bearings, is coupled directly to the drum shaft. Inside of the iron drum are stationary field coils.

The fundamental principle of the brake is based on utilization of the braking effect, resulting from the rotation of the iron drum through a magnetic field of variable flux density. Electric current is admitted to the field coils resulting in generation of eddy currents in the rotating drum. Energy required to generate this current is represented by the torque applied to the rotor shaft. The degree of the braking effect is controlled by the amount of excitation, that is of electric current admitted to the field coils. The higher the excitation, the higher the torque developed in the brake.



A. ROTOR
B. ROTOR SHAFT
C. INDUCTOR SURFACE ON ROTOR
D. INDUCTOR FIELD POLES
E. FIELD COILS
F. WATER INTLET
G. WATER OUTLET

Fig. 21—Schematic sketch of an electromagnetic draw-works brake

Since some movement is needed of the iron drum in relation to the coils for the brake to become operative, an electromagnetic brake cannot bring the draw-works drum to a dead stop or hold or feed off the load. As is the case with the hydraulic brake, a mechanical friction brake is still needed to perform these operations. An electromagnetic brake saves the wear of the friction brake by taking the shock loads and sustained dead loadings.

Cooling

To take care of the heat generated within the brake as a result of absorption of energy, a water-cooling system is provided. Bearings and field coils are permanently sealed so that direct circulation of water through the drum is made possible. Cooling water passes through the air gap directly to the drum surface where the heat is generated. Circulation rate of 50 g.p.m. is considered as adequate for most severe conditions. Proper cooling is essential to the satisfactory operation of the brake and automatic signals are provided warning the operator if the circulation is cut off or if the temperature of the cooling water becomes excessive.

Loads and Speeds

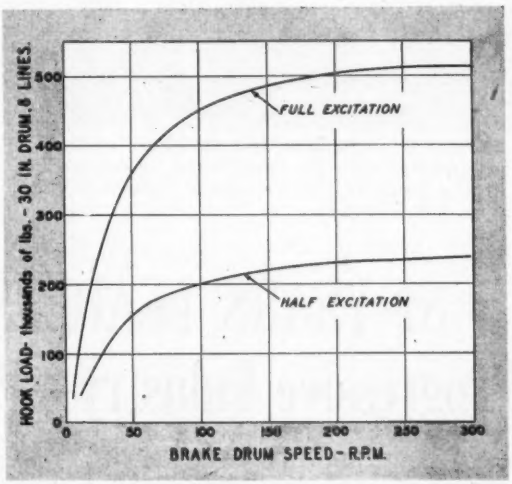
Chart in Fig. 22 shows the relationship between hook loads and drum speeds. The chart, representing manufacturer's specifications for the largest model of the brake now built, gives average figures only. Accurate hook loads are difficult to calculate because of the number of factors involved. The chart was prepared by securing the torques from actual tests and by calculating the corresponding hook loads for conditions of 30-in. drum and eight lines. The main purpose of the chart is to show the low speeds to which the loads may be slowed down. These speeds are sufficiently low to permit setting of slips without using the friction brake.

The chart shows curves for two degrees of excitation. Intermediate steps provide for wide selection of the drum speeds.

Electric current to the field coils is supplied through suitable controls. Operation of the controls is from the driller's position. In the recommended arrangement the controls are regulated from the standard brake lever in brake-lever positions preceding those which put in operation the friction brake. Thus, in event of an emergency, such as power failure, mechanical brakes immediately may be brought into play by further depressing of the lever. Other arrangements, such as foot-pedal control, are also used.

An electromagnetic brake is of the size comparable to the hydraulic brake and is similarly mounted.

Fig. 22—Relation between load and speed for different degrees of excitation



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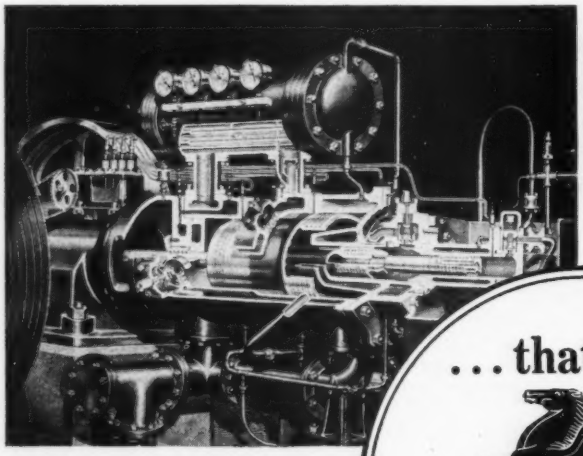

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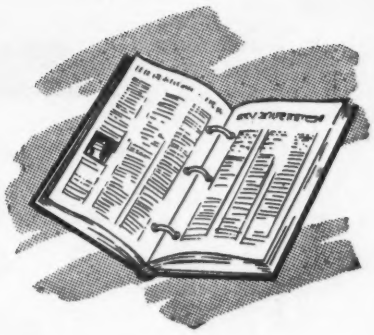
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

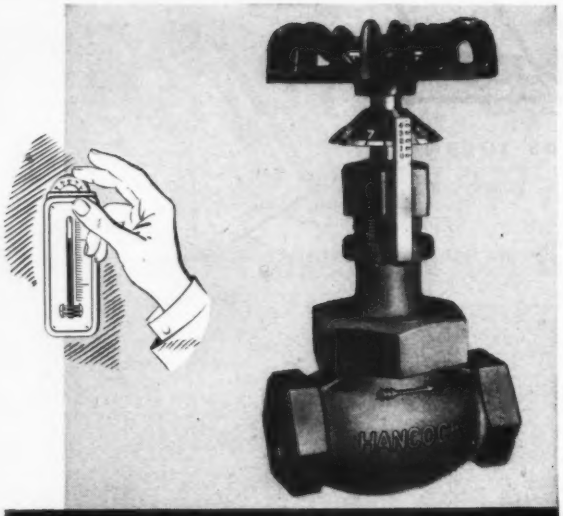


Reciprocating-Pump Data

G.p.m.	Size of pump (in.)	Kind	Rated working pressure (psi.)	Pump speed (r.p.m.)	Piston speed (ft./min.)	Discharge pressure—70% of theoretical—exhaust at 14.7 psia. 100-lb. steam	125-lb. steam	150 lb. steam	Steam required at rated pressure (lb./hr.)	Approx. weight (lb.)
2.75	1¼ x x 2	Triplex	250	86	....	....	....	....	*0.6	....
5.85	1¾ x x 2½	Triplex	250	75	....	....	....	....	*1.3	....
9.15	2 x x 3	Triplex	250	75	....	....	....	....	*2.1	....
11.2	3 x 2 x 3	Piston duplex	200	72	36	158	197	236	200	175
11.4	4 x 2½ x 5	Boiler simplex	220	58	24	179	224	268	200	220
12.0	4½ x 2¾ x 6	Boiler simplex	230	48	27	188	234	281	215	240
17.0	3½ x 3½ x 4	Simplex	75	120	40	70	87	105	100	200
17.4	3½ x 2¼ x 4	Piston duplex	200	66	44	170	212	256	290	200
26.0	4½ x 2¾ x 4	Piston duplex	200	66	44	187	234	280	410	380
28.0	3 x x 4	Triplex	250	68	....	....	....	....	*6.3	....
29.0	6 x 3 x 6	Piston duplex	240	46	46	280	350	420	550	600
35.0	4½ x 3¾ x 4	Piston duplex	100	52	35	101	158	190	250	300
37.3	5¼ x 3½ x 5	Piston duplex	200	59	39	158	197	237	570	560
39.0	6⅛ x 4 x 8	Boiler simplex	200	48	32	164	205	246	530	550
48.3	4½ x 3¾ x 4	Piston duplex	75	66	44	101	126	151	270	410
49.0	7½ x 3½ x 8	Piston duplex	400	34	46	322	402	482	1,400	300
52.7	7½ x 3 x 10	Piston duplex	500	45	75	437	546	655	1,870	1,120
52.7	10 x 3 x 10	Piston duplex	650	45	75	622	777	934	2,400	2,300
54.0	5½ x 5½ x 7	Simplex	75	51	30	70	87	105	260	300
65.0	6 x 4 x 6	Piston duplex	200	52	52	158	197	236	910	650
71.8	7½ x 3½ x 10	Piston duplex	500	45	75	322	402	483	2,480	1,100
71.8	10 x 3½ x 10	Piston duplex	800	45	75	570	714	855	3,930	2,450
84.0	4 x x 6	Triplex	200	87	46	....	....	....	*15.1	....
76.6	10 x 3½ x 12	Piston duplex	800	40	80	570	714	855	4,250	2,450
76.6	12 x 3½ x 12	Plunger duplex	900	40	80	822	1,028	1,230	4,850	4,700
88.0	10 x 6 x 8	Boiler simplex	240	48	32	195	242	293	1,260	1,300
91.6	5¼ x 4¾ x 6	Piston duplex	75	52	52	85	106	127	470	630
93.8	7½ x 4 x 10	Piston duplex	200	45	75	246	307	368	1,250	1,120
93.8	10 x 4 x 10	Piston duplex	800	45	75	437	546	656	5,100	2,450
100.0	10 x 4 x 12	Piston duplex	800	40	80	437	546	656	5,400	2,450
100.0	12 x 4 x 12	Plunger duplex	900	40	80	630	786	945	6,100	6,100
97.0	7½ x 4½ x 10	Piston duplex	250	72	60	194	243	291	1,590	1,800
119.0	10 x 4½ x 10	Piston duplex	800	45	75	346	433	520	5,500	2,450
126.8	10 x 4½ x 12	Piston duplex	800	40	80	346	433	520	6,750	2,450
126.8	12 x 4½ x 12	Plunger duplex	600	40	80	499	622	747	5,100	4,700
126.8	14 x 4½ x 12	Plunger duplex	600	40	80	678	846	1,015	5,100	5,000
134.5	6 x 5¾ x 6	Piston duplex	75	52	52	76	95	114	650	860
146.5	7½ x 5 x 10	Piston duplex	200	45	75	158	197	236	1,850	1,430
146.5	9 x 5 x 10	Piston duplex	200	45	75	226	283	340	1,850	1,670
156.0	14 x 5 x 12	Plunger duplex	900	40	80	548	685	822	9,400	7,300
157.0	14 x 8 x 12	Boiler simplex	200	75	75	210	262	314	1,970	1,400
157.0	8 x 8 x 12	Simplex	75	75	75	70	87	105	750	900
220.0	6 x x 8	Triplex	200	75	....	....	....	....	*39.6	....
211.0	9 x 6 x 10	Piston duplex	200	45	75	158	197	236	2,600	1,525
211.0	10 x 6 x 10	Piston duplex	200	45	75	194	243	291	2,600	1,925
225.0	10 x 6 x 12	Piston duplex	200	40	80	194	243	291	2,750	2,075
287.0	10 x 7 x 10	Piston duplex	200	45	75	142	178	214	3,500	1,925
423.0	10 x 8½ x 10	Piston duplex	100	45	75	97	121	145	2,450	2,780
506.0	12 x 9 x 12	Piston duplex	100	40	80	124	155	186	2,850	3,700
756.0	12 x 11 x 12	Piston duplex	100	40	80	82	103	124	4,500	5,400

*Approximate horsepower required from engine.

No. 143 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



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What a great advantage where it is essential to maintain a pre-determined amount of flow through the lines! How vital in the oil industry where such control is often a vital factor in processing.

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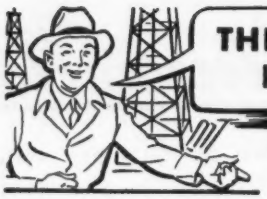

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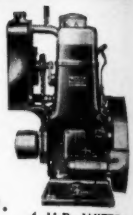
Maintain schedules, cut time and costs with continuously dependable WITTE Diesel Engines from 4 to 12 H.P.—and Dieselectrics from 3 to 10 KVA. Start and operate on non-explosive, low-cost Diesel fuel. Realize savings up to 75% over gasoline powering. These amazingly efficient WITTE Diesel units need no expert operator nor constant attendance, occupy little space.



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WITTE Diesel Engines are factory tested for power and performance and WITTE Dieselectrics for ample output of dependable electric light and power. You can have quick delivery of the WITTE Diesel unit that meets your needs. Write for catalog now.

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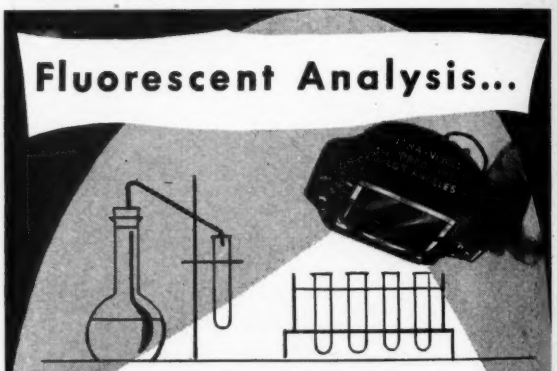
AMERICA'S PIONEER BUILDER OF SMALL DIESELS — KANSAS CITY 3 MO. U.S.A.

Fluorescent Analysis...



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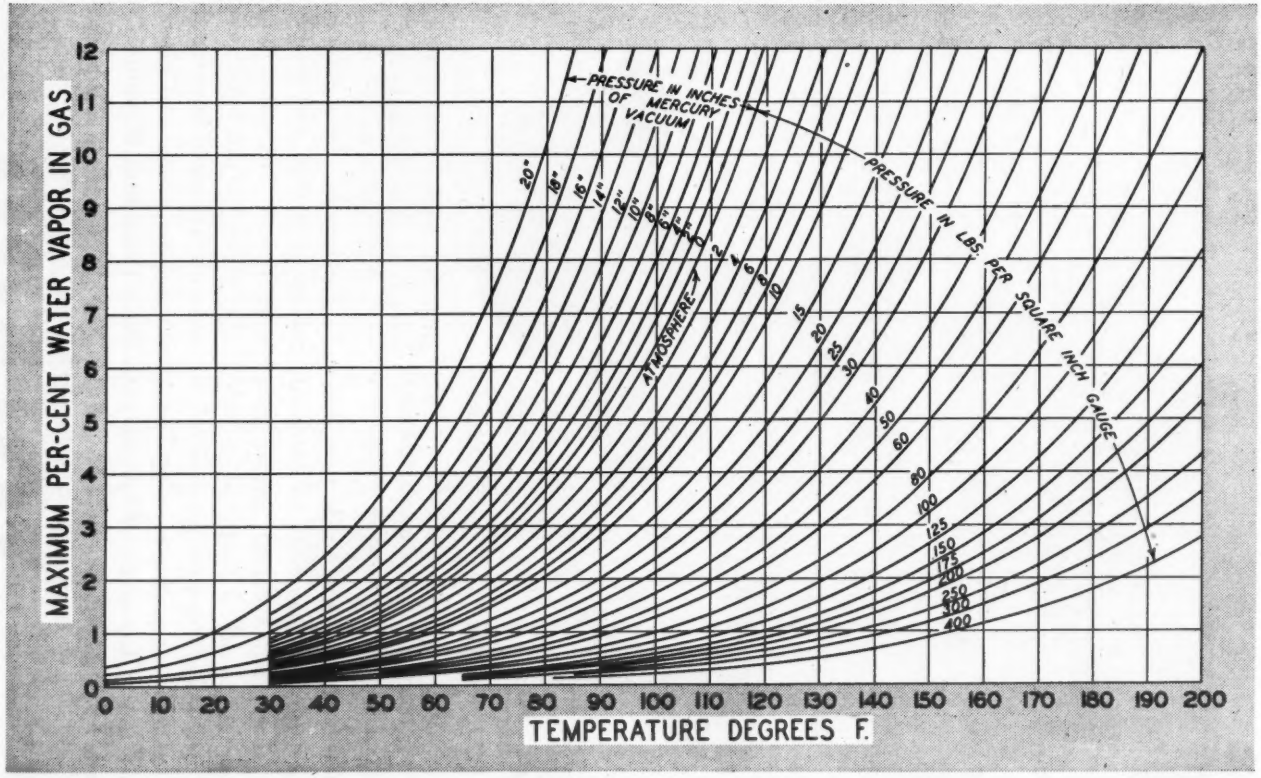
Ultra Violet **PRODUCTS, INC.**

5205 Santa Monica Blvd., Los Angeles 27, Calif.

Maximum Per Cent by Volume of Water Vapor in Gas

(14.73 Psi. Atmospheric Pressure)



Maximum per cent of water vapor for gage pressure

$$= \frac{\text{Partial pressure of water in psi.}}{\text{14.73 + gage pressure in psi.}}$$

Maximum per cent of water vapor for vacuum pressure

$$= \frac{\text{Partial pressure of water in psi.}}{\text{30 in. of mercury}}$$

Actual per cent of water vapor by volume = maximum per cent of water vapor × relative humidity.

Note: Partial pressure of water vapor taken from Goodenough's Steam Tables.

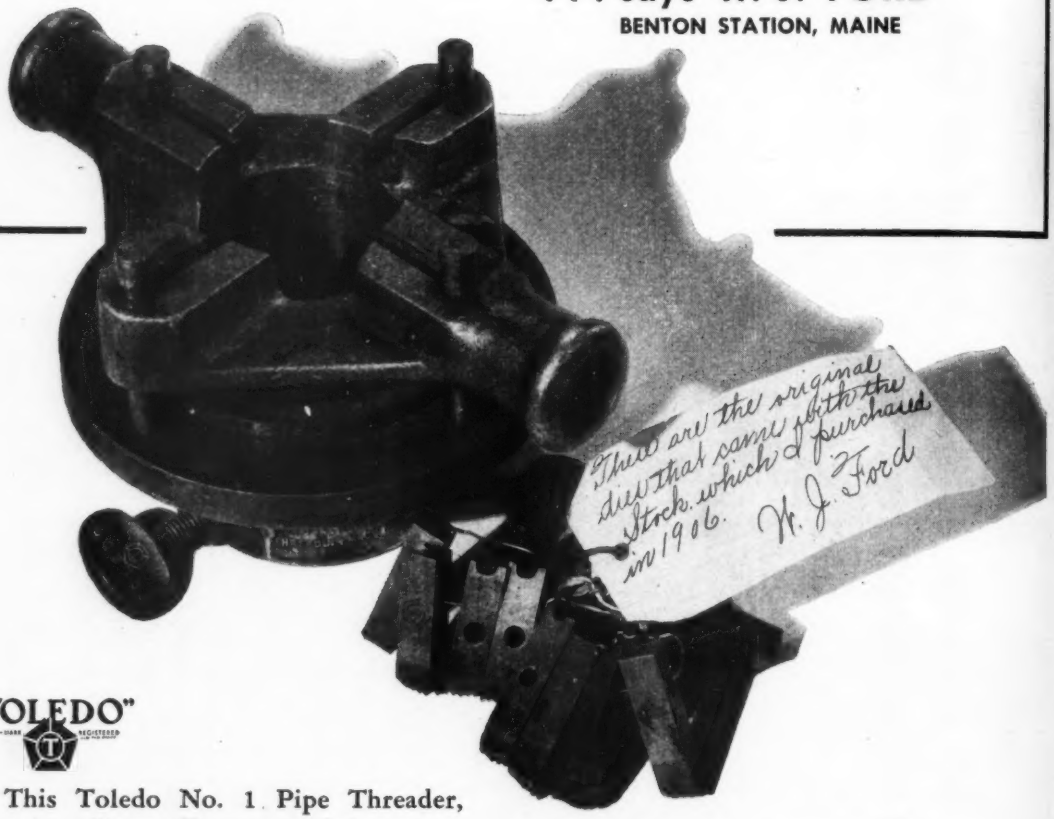
ENGINEERING *fundamentals*

No. 285

This is the first of a series of useful graphs, alignment charts, and fluid-flow curves presented through the courtesy of the Southern California Meter Association.

"This Toledo Threader in constant use SINCE 1906"

. . . says W. J. FORD
BENTON STATION, MAINE



"TOLEDO"

This Toledo No. 1 Pipe Threader, capacity 1″ to 2″, was sold by us on October 14, 1905, to a Boston distributor and purchased by W. J. Ford in 1906.

Mr. Ford says, "This stock was purchased in 1906 and has been in constant use ever since, but I cannot recall how many new sets of dies I have had to have in that time. *It has threaded pipe enough to reach three times around the world* and I am on the fourth lap now. When that is completed, I am going to retire and will ship the stock to you if you would like to have it to put on exhibition."

★ ★ ★

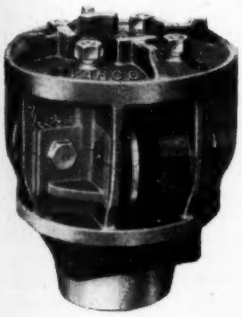
Today—the same basic principles of advanced design and quality construction keep Toledo Threaders the *preferred* tools of experienced mechanics everywhere! Get set with Toledo Threaders on *every* job—do it *better, faster* and *easier!* The Toledo Pipe Threading Machine Co., Toledo, O. New York Office, No. 2 Rector St. Bldg.

TOLEDO
PRECISION PIPE TOOLS

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

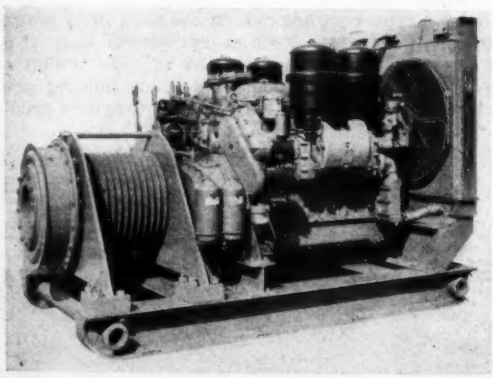
by John M. Spears



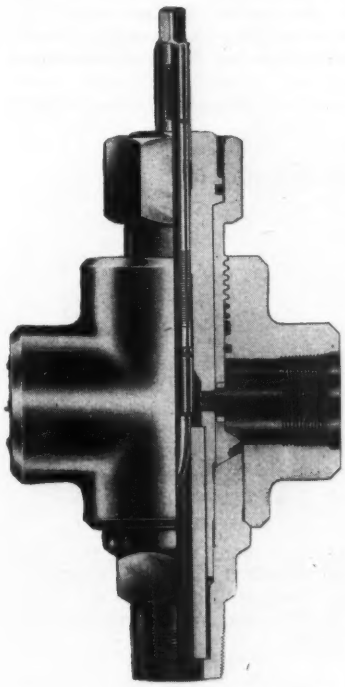
(1) VARCO ROLLER KELLY BUSHING eliminates possibility of rocking by bringing all parts 3⅛ in. closer to rotary table. Large-diameter roller gives maximum contact surface with kelly. A skirt below the square adds the necessary weight to the bushing, and also acts as a stabilizer. Bottom of skirt is faced and drilled to take a Patterson-Ballagh kelly wiper. Alemite fittings, countersunk into each roller pin, are easily accessible yet fully protected from damage. Long life is assured by heavy construction of bushing body. *Abegg & Reinhold Co.*

IT'S NEW CHECK IT

(2) V-BELT MUD-PUMP DRIVE permits a 7¼-by-14 mud pump and a 260-hp. General Motors Twin Diesel engine to be mounted on one skid, within allowable road limit. In new V-Belt design engine drives through a hollow shaft and through a coupling, with the sheave between engine and coupling. Sheave is keyed to a hollow shaft which rides in heavy-duty self-aligning S.K.F. bearings with the bearing cages bolted to the heavy side-plate supports. Engine shaft projects through the hollow shaft and is under pure torsional loading through the Falk airflex coupling. In this manner a sheave "side load" is taken within the length of a shaft which carries torsional load only. At the same time, pulsations of mud pump are absorbed by rubber in coupling before they reach the engine shaft. *Anderson-O'Brien Co.*



IT'S NEW CHECK IT



(3) NEW FLOW WING for 3,000-lb. working pressure provides in a single compact unit either an adjustable or positive flow bean plus a wing valve for choke changing. Illustration shows unit fitted with adjustable choke. Valve section is shown in open position. It is closed by screwing valve down to its seat, using an all-purpose wrench which fits the hex on the valve stem. The bean retainer, which screws inside of valve stem, may be removed easily by wrench when it is necessary to replace beans. Valve and seat are faced with hard metal to resist cutting. Both valve and seat, as well as all other parts, are replaceable without removing unit from the well. *Cameron Iron Works.*

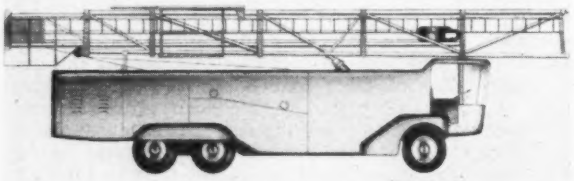
IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

OIL AND GAS EQUIPMENT Digest — IT'S NEW CHECK IT

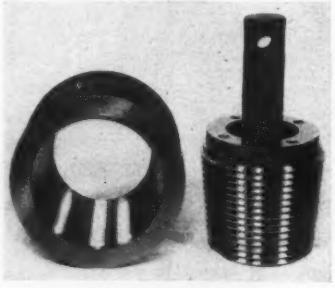
(4) PORTABLE SERVICING AND DRILLING RIG provides easier, faster spotting by driving into well location nose first instead of backing in. New self-propelled rig services wells to 4,000 ft. and works over wells to 2,500 ft. It has a net hook horsepower of 117 and will start 4,000 ft. of 2½-in. tubing off bottom at 90 ft. per minute with three lines up. Unit is comprised of a double-drum hoist



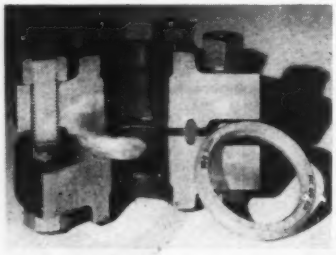
with single-engine drive, torque converter or gear transmission, right-angle gear box, and portable telescoping derrick, all mounted on a streamlined six-wheel chassis. Functional design provides better balance and less weight, increasing speed of moving and erection. Power controls are placed at derrick leg for best operating vision. Motor at rear of unit is easily accessible, completely guarded by streamlined contour guards. *Waldrip Engineering Co.*

IT'S NEW CHECK IT

(5) NEW A. P. I. GAGES for tool joints, cable-tool joints, sucker rods, standard tubing, line pipe, and casing are available in master and working plug and ring types. Sizes range from ⅛-in. to 13-in. diameters for tapered pipe threads. Constant-diameter gages are available from No. 0-80 (80 threads per inch) to Acme threaded gages 13-in. diameter. All standard gages are manufactured to American Gage Design Standards and steel gages are scientifically heat treated and normalized before final grinding. *Vard, Inc.*

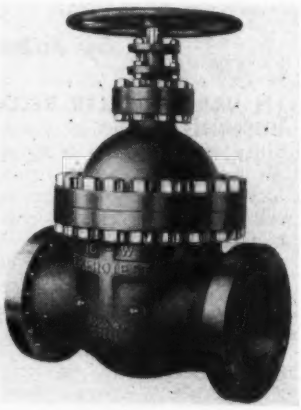


IT'S NEW CHECK IT



(6) FIBERGLAS-PLASTIC GASKET helps solve oil and gas-well corrosion problems. Gasket is a high-strength, high-dielectric laminate consisting of plies of Fiberglas cloth impregnated with a phenolic resin, and precision molded under high pressure and temperature. High dielectric strength of new gasket makes it possible, by using it in ring-sealed joints, to provide insulation against the stray and long-line electrical currents that flow from the connecting pipe-line system into uninsulated well structure. Gasket also eliminates corrosion at the joint, caused by active galvanic cell set up at the joint by dissimilar metals in the presence of a low-resistance electrolyte. *Plastic Engineering Sales Corp.*

IT'S NEW CHECK IT



(7) PRESSURE-LUBRICATED DRILLING VALVE provides for high-pressure lubrication of wedge seats and stuffing box. Alemite-lubrication fittings are scientifically located on valve body and stuffing box to prevent damage during handling on derrick floor or in transit. Lubricator fittings take lubricating gun directly. An internal and an external seal prevents leakage or blow-outs under heaviest pressures. Stuffing-box lubrication reduces wear on the stem, eases operation, and gives additional lubrication to the packing. On the wedge seats, lubrication adds seal against leakage, provides for easier movement, and reduces corrosion. *Kerotest Manufacturing Co.*

IT'S NEW CHECK IT

(8) PORTABLE PIPE LINE incorporates quick laying, immediate use, and fast dismantlement for "quick service" conditions involving temporary moderate-pressure lines. Lightweight 16-ft. pipe sections are quickly engaged by a new coupling which operates on a pressure-encirclement principle. Formed cylindrical body of coupling permits angular adjustment of pipe within coupling body without leakage or loss of holding power. A helical annular coil seated in taper throat of coupling

body is held in place by a rubber pressure and sealing ring which acts as an annular piston when subject to line pressure and drives the coil against the taper of coupling throat. Coil turns are spaced narrowly, and each coil turn sets up a strut action between throat taper and encircled pipe surface. *McDowell Manufacturing Co.*

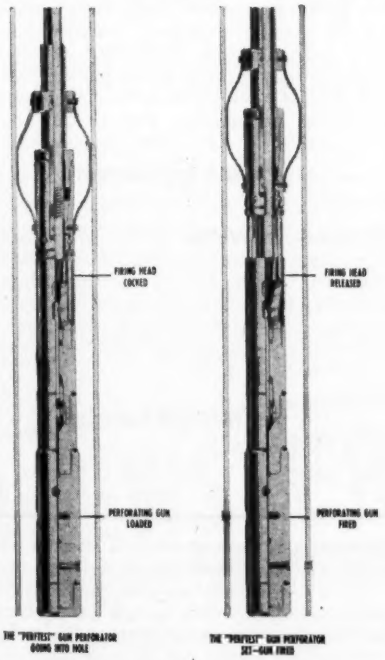
IT'S NEW CHECK IT

(9) NEW MAR-FLEX PIPE JOINTS are contrasted in size to that of a man. These stainless steel expansion joints are made in all metals, with optional ends for welding directly into pipe line, in sizes ranging from

1 to 120-in. diameter. Built for extremely elastic movement, having unlimited thicknesses, they absorb strains, vibration, and lateral distortion; are tailored to fit individual requirements, and possess deep angular corrugations. A single self-equalizing unit absorbing up to 8-in. traverse is included among types. *Marquette Coppersmithing Co.*

IT'S NEW CHECK IT

(10) ALL-PURPOSE GUN PERFORATOR is a safe mechanically operated gun perforator which can be run

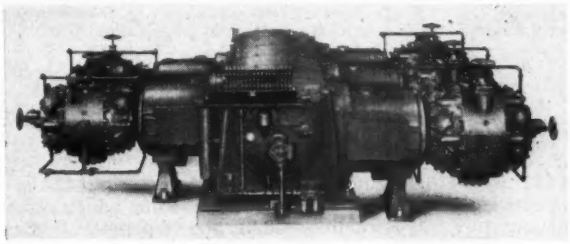


THE "PERFTEST" GUN PERFORATOR GOING INTO HOLE — THE "PERFTEST" GUN PERFORATOR SET—GUN FIRED

in a well on tubing or drill string. When attached to pressure recorder and formation tester, combined perforation and formation testing operations may be achieved. For perforating casing, unit is lowered to zone selected for perforation on the bottom joint of tubing or drill string. It consists of a mechanical firing head to which may be attached any number of perforating-gun sections. Each section fires four or five bullets to form a pattern of perforations 90° apart with a vertical measurement of 2½ in. from center to center. Number of perforating-gun sections to be attached to firing head depends solely on number of perforations desired and extent of zone to be perforated. Simple top-hole manipulation of the string by driller fires the gun perforator to perforate casing and actuates tester assembly to test formation immediately following perforation. *M. O. Johnston Oil Field Service Co.*

IT'S NEW CHECK IT

(11) MOTOR-DRIVEN COMPRESSOR offers tremendous space-saving possibilities in oil and gas, chemical, process, and other industries. Unit is available in six sizes with a great variety of compressor cylinders and offers a wide range of volumes and pressures for handling air or gas. It is built with from one to six crank



throws and ranges in horsepower from 500 to 2,750. Compressor stroke is 14 in. and it operates at a speed of 300 r.p.m. Power for driving it can be taken from a standard synchronous electric motor, an engine, or a turbine. All cast parts are of Meehanite metal. *The Cooper-Bessemer Corp.*

IT'S NEW CHECK IT

(12) NEW CORROSION INHIBITOR (Elset) functions by building a protective film of molecular thickness on well equipment surfaces that are exposed to destructive fluids. The chemical is dispersed in water, then introduced into casing through a lubricator. Continuous injection is reported unnecessary, but rather, about 2 qt. every other day has proved very satisfactory in field applications to corrosion-troublesome wells. *Turco Products, Inc.*

IT'S NEW CHECK IT

TRADE LITERATURE

(13) TOPOGRAPHIC SURVEYS. New bulletin describes how large areas of ground can be surveyed from the air and topographic maps made from aerial photographs. Included are articles by well-known highway officials explaining how contour maps developed from aerial-

survey photographs have saved money and time. This aerial-survey technique, known as the Brock method, was used extensively in surveying plant sites before and during the war. *Aero Service Corp.*

IT'S NEW ✓ CHECK IT

(14) PARAMINS CHART. New 20 - by - 25-in. chart adaptable for office or shop walls gives properties and tests of various additive improvers for all types of petroleum products including premium and heavy-duty motor oils, industrial specialties, and gasolines. Information includes brand, type, components, application, and miscellaneous data. *Enjay Co., Inc.*

IT'S NEW ✓ CHECK IT

(15) PRESSURE-REDUCING VALVES. Illustrated bulletin describes small-volume pressure-reducing and regulating valves. Variations in standard design are presented for special installations. Cutaway nomenclature drawing included. *A. W. Cash Valve Manufacturing Corp.*

IT'S NEW ✓ CHECK IT

(16) SELECT-O-PHONE. New four-page folder describes and gives advantages of private automatic telephone and paging system with 36-line capacity. A typical layout illustrates but one of countless variations possible. *Kellogg Switchboard & Supply Co.*

IT'S NEW ✓ CHECK IT

(17) NUKEMITE. Informative bulletin describes the application of solution of inert synthetic resins which, upon drying, form an attractive, tough, and impenetrable film of exceptional elasticity. This leak-proof noncontaminating coating is used wherever there is a corrosion problem in refineries, natural-gasoline plants, cycling plants, chemical plants, etc. *Nukem Products Corp.*

IT'S NEW ✓ CHECK IT

(18) VARIABLE - V - PLANETARY SPEED SELECTOR. A two-color broadside describes rugged construction of infinite-ratio speed selector, which employs planetary motion with four variable-pitch sheaves and two standard cross-section V-belts to provide any speed from zero to 800 r.p.m. at constant torque from a constant-speed power source. Featured is a page outlining the engineering principles of operation. Illustrated. *B. F. Goodrich Co.*

IT'S NEW ✓ CHECK IT

(19) FLUID HANDLING EQUIPMENT. An eight - page catalog describes and illustrates fluid-handling equipment for refineries, natural-gasoline plants, cycling plants, and other process industries. Items treated are seven different pipe-line strainers, remote valve-control boxes and assemblies, discharge check valves, lint interceptor, volatile liquids intercepting drain, and low-density insolubles interceptors. *J. A. Zurn Mfg. Co.*

IT'S NEW ✓ CHECK IT

(20) MAGNETIC PLUGS. New 21-page loose-leaf bulletin describes magnetic plugs similar in design to ordinary drain or fill plugs used in all lubrication systems, but with a permanent magnet anchored in the body of the plug. Magnet poles contact lubricant as it circulates, and pull out and hold any harmful metal parts which may be present in oil or grease. *Lisle Corp.*

IT'S NEW ✓ CHECK IT

(21) DIESEL ENGINES. New two-color catalog covers small diesel engines for many oil-field applications. Descriptive material includes illustrations, applications, features, standard equipment, and specifications. Twenty pages. *Witte Engine Works.*

IT'S NEW ✓ CHECK IT

(22) AIR FILTRATION. New 23-page illustrated booklet discusses various types of engine, compressor, and other dust problems and typical applications of air filters to such problems. Included is a chart of size and characteristics of air-borne solids. *American Air Filter Co.*

IT'S NEW ✓ CHECK IT

(23) WELL LOGGING SERVICE. New two-color bulletin covers new type of well log known as the Hydrocarbon Profile Log. Description includes how assembly of data and determination of the H.P. curve, along with drilling engineering service, gives information about the formations drilled and protects any well against many drilling hazards. *Engineering Service Co.*

IT'S NEW ✓ CHECK IT

(24) COOLING TOWERS. Folder describes mechanical-draft cooling towers developed to solve the water-cooling problems encountered by designing engineers, contractors, service and process operation men, and owners of heat-generating equipment. Includes installation and maintenance, general specifications, and capacity table. *J. F. Pritchard & Co.*

IT'S NEW ✓ CHECK IT

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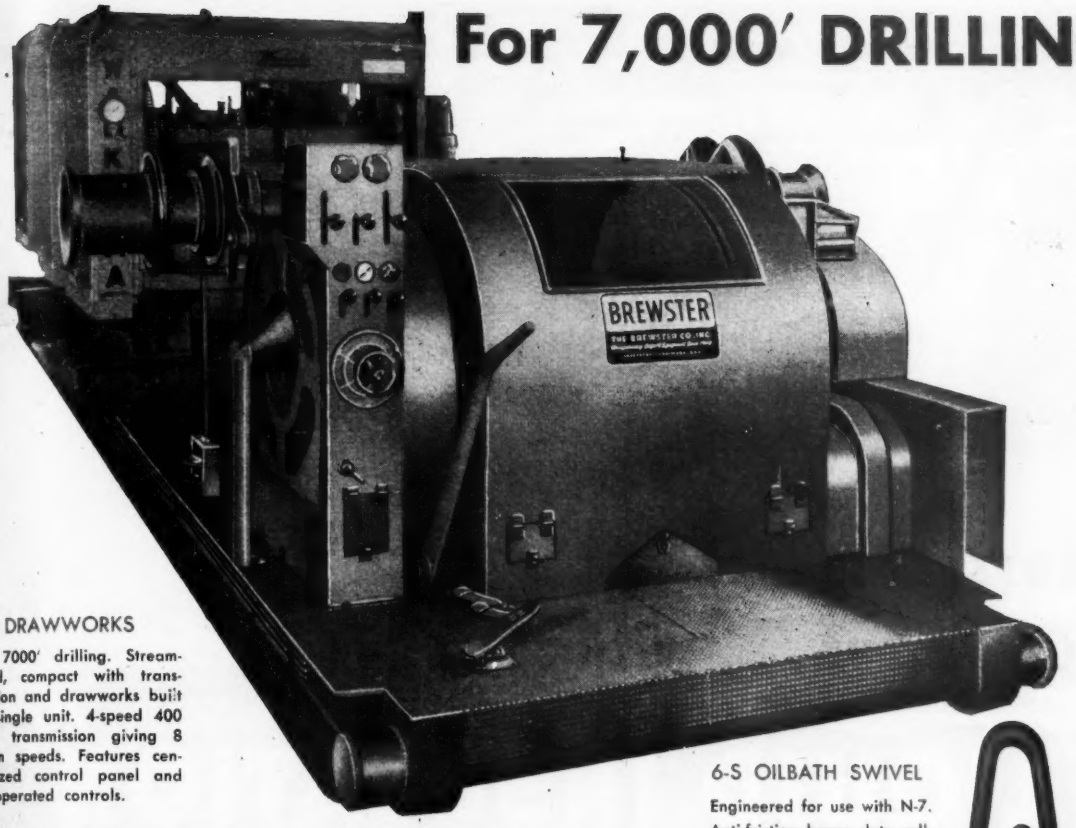

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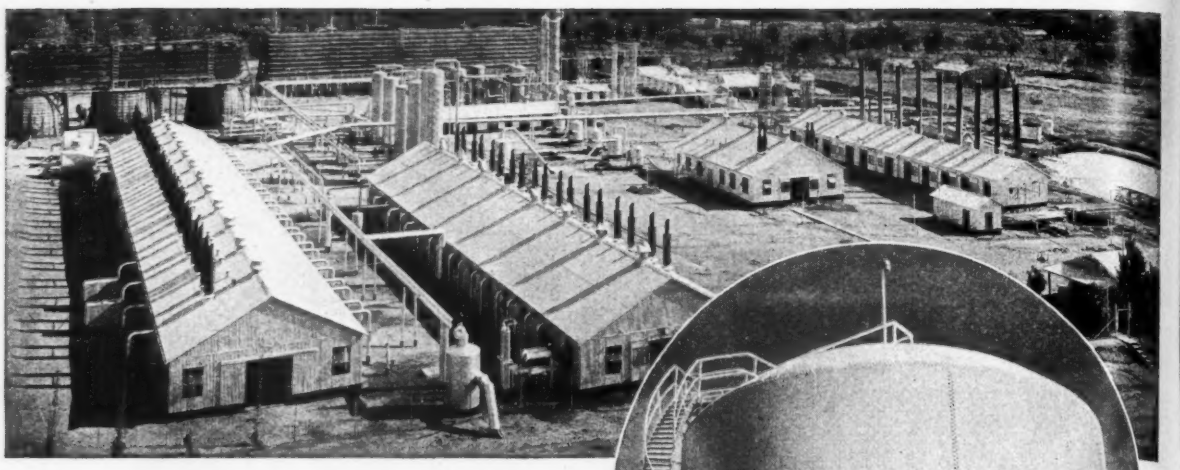

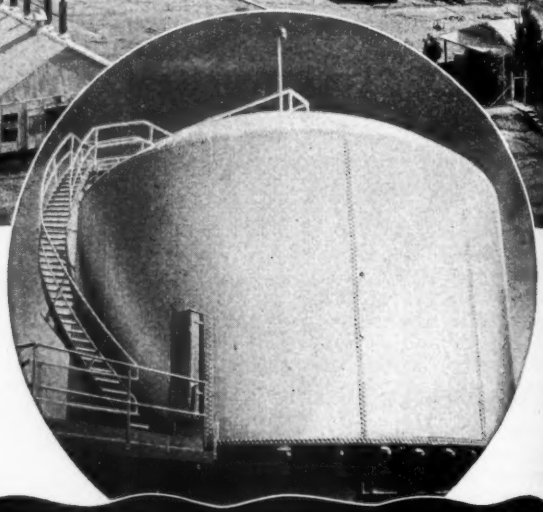

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NATURAL GAS

Big Inch Delivery Allocations Continued

WASHINGTON.—The Federal Power Commission has extended temporarily present allocations of natural gas delivered from the Big and Little Big Inch pipe lines during interim operation of the lines by Texas Eastern Transmission Corp.

The company's lease from War Assets Administration becomes effective May 1, and the FPC's new allocation order takes effect at the same time. The order will continue in force until further action of the commission following early conference with interested state regulatory commissions and the Industry Advisory Committee, an FPC announcement said.

On the basis of expected deliveries through the lines of about 140,000,000 cu. ft. daily, the allocations will provide deliveries of approximately as follows: Panhandle Eastern Pipe Line Co., 20,000,000 cu. ft. daily; Columbia Gas & Electric system, 51,700,000 cu. ft. daily; Consolidated Natural Gas system, 36,300,000 cu. ft. daily; National Fuel Gas Co., 14,500,000 cu. ft. daily; Equitable Gas Co., 16,000,000 cu. ft. daily; and Carnegie Natural Gas Co., 1,500,000 cu. ft. daily. Texas Eastern Transmission, high bidder for the lines, is studying plans for converting the system and extending the lines to market connections which would entail investments of from $38,905,000 to $60,740,000.

Carbon Black's Economic Position Good, Official Says

An optimistic future for the carbon-black business, despite the prospect of rising natural-gas prices, is predicted by Reid L. Carr, president of Columbian Carbon Co.

At the annual meeting of the company, Carr said that, in general the outlook for the company's business is good. "We are confident that there will be a demand for all the carbon black we can produce this year," he stated.

"Some concern has been expressed lest the rising cost of natural gas will have an adverse effect on our profits. I see no reason why the increase in the cost of our raw material should not be added to the price of our products. The fact is that carbon black at present prices is actually from 33 to 50 per cent cheaper on a volume basis than the rubber which it replaces. In other words, even if it should become necessary to raise the price of carbon black to the rubber trade by as much as 33 per cent, it would still be no more expensive than the corresponding volume of rubber."

The Columbian president reported carbon-black production, including that for the account of associated companies, approximated 78,000,000 lb. in the first quarter.

March Natural-Gas Sales Up Nearly 20 Per Cent

Extended periods of cold weather in March 1947 compared with mild weather a year ago brought a gain of nearly 20 per cent in natural-gas sales during the month, the American Gas Association reports.

Natural-gas sales for March 1947 were 2,509,000,000 therms, an increase of 19.9 per cent over sales for March 1946. For the 12 months ended March 31, sales of natural gas totaled 26,612,000,000 therms, an advance of 4.1 per cent over the previous year. The association's index of natural-gas sales stood at 221.1 per cent of the 1935-39 average on March 31, 1947.

Sales of all three types of utility gas—natural, manufactured, and mixed—showed a gain of 21.2 per cent for March. Sales in the 12-month period ended March 31, 1947, registered a gain of 5 per cent over the preceding 12 months. In its monthly report, the association commented that the sharp rise in gas sales "reflects the huge demand for gas house heating and the efforts of gas utility companies to meet this unprecedented demand despite shortages of steel and other materials that are obstructing expansion of the transmission and distribution plants."

Central Kentucky Natural Proposes New 24-In. Line

WASHINGTON.—Central Kentucky Natural Gas Co. has applied to the Federal Power Commission for authorization to construct facilities to be used to deliver additional natural gas to Cincinnati Gas & Electric Co. and Union Light, Heat & Power Co. to meet estimated peak-day requirements for the winter seasons of 1947-48 to 1950-51.

Costs of the facilities has been estimated by Central Kentucky at $1,933,000. Construction is planned to begin not later than June 1, 1947, depending upon receipt of pipe and other materials from suppliers.

Six U. S. Carbon-Black Plants Placed on Market

Six war-built channel-type carbon-black plants which cost the Government an aggregate of $20,282,000 are now being offered for sale or lease by War Assets Adminstration.

The plants and wartime operators are: Cabot Carbon Co., Guymon, Okla.; Charles Eneu Johnson & Co., Monument, N. M.; Panhandle Carbon Co., Eunice, N. M.; Columbian Carbon Co., Seagraves, Tex.; United Carbon Co., Odessa, Tex., and the Continental Carbon Co., Sunray, Tex.

Natural Gasoline

Heinzerling is President of Supply Men's Association

J. H. HEINZERLING

New president of the Natural Gasoline Supply Men's Association is John H. Heinzerling, associated with Vinson Supply Co., Tulsa. Formerly first vice president of the association, he was elected at the recent annual meeting in Dallas to succeed Fred Wetzel, Ingersoll-Rand Co., Tulsa.

Heinzerling, who was graduated in 1931 from Johns Hopkins University with a degree in chemical engineering, has been with Vinson Supply 6 years. Previously he served for 7 years as a chemical engineer in the research department at The Texas Co.'s Port Arthur refinery. Earlier he was with the Foxboro Co. in Dallas.

J. A. Knebel, second vice president of the Natural Gasoline Supply Men's Association, is district manager of the H. K. Porter Co., in the Southwest, parent company of Hinderliter Tool Co.

Petroleum Engineering, Inc., Building Buchanan Plant

The natural-gasoline recovery plant in process of erection near Magnolia, Ark., for D. E. Buchanan is being designed, engineered, and constructed by Petroleum Engineering, Inc., according to an announcement by Paul M. Raigorodsky, president of the company.

For many years Victaulic Pipe Couplings made by the Victaulic Company of America have been noted for *flexibility* in joints of metal pipelines that handle liquids and gases.

Sound and ingenious engineering developed the Victaulic Coupling . . . and this same engineering chose Perbunan for the synthetic rubber gasket that triple-seals the flexible Victaulic Couplings used in pipelines handling petroleum liquids and gases . . . because Perbunan *rates extremely high* in resistance to petroleum products . . . maintains flexibility under extremes of heat and cold . . . in fact, meets *all* of Victaulic's service requirements!

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REFINING

Sinclair's Houston Plant Expansion Plans Announced

About $35,000,000 will be spent in expanding and improving facilities in the Houston refinery of Sinclair Refining Co., Harry F. Sinclair, president of Sinclair Oil Corp., has announced.

The program there is a part of an over-all expansion program to cost an estimated $150,000,000, Sinclair said. Other changes already are under way in the company's plants in Chicago, Marcus Hook, N. J., Wellsville, Ohio, and Sinclair, Wyo.

Among other improvements, the daily gasoline output capacity at Houston will be increased 15,000 bbl., Sinclair said.

The expansion program, he declared, does not include a $50,000,000 expansion and improvement program by Richfield Oil Corp., of which Sinclair is chairman of the board.

In mid-March Sinclair announced plans for construction of more than 3,000 miles of products pipe lines, designed to connect existing lines to bring Atlantic Coast, Gulf Coast, and Great Lakes refineries into a coordinated transportation system. *(The Oil and Gas Journal, March 22, page 134).*

New Shell Grease Plant Turning Out Products

A new process for the manufacture of greases continuously as contrasted to the batch method, is now in operation in the Martinez, Calif., refinery of Shell Oil Co., Inc. New equipment for the plant, first of its kind in the West, was installed at a cost of $150,000.

The plant is producing a complete line of aluminum-base greases and a line of lithium-base greases. Under the new process, ingredients go into compounding facilities continuously. The complete process is continuous and automatic, including automatic temperature control and a new method of continuous homogenization.

W. P. R. A. Meeting Set For Fort Worth, May 23

Technical papers by Arch L. Foster, refining editor of The Oil and Gas Journal, Tulsa, and Robert L. Purvin, consulting engineer, Dallas, are scheduled to be given at a technical meeting of the Western Petroleum Refiners Association in the Blackstone Hotel, Fort Worth, May 23.

Foster's paper will be "Trends, Progress, Products Disposal in Distillate Cycling." Purvin will address the group on "Suspended Catalytic Cracking." The meeting will open at 2 p.m. and adjourn following dinner that evening.

A second regional technical meeting will be held at the Broadview Hotel, Wichita, Kans., June 6, featuring a question-and-answer program with H. L. Bedell, Socony-Vacuum Oil Co., Inc., Augusta, Kans., serving as chairman. A panel of five industry men and engineering firm representatives will answer questions of a technical nature.

Petroleum Unloading Restrictions Repealed

Restrictions on the hours during which petroleum-carrying vehicles may unload have been repealed by both the Kansas and Nebraska legislatures.

The Kansas law makers adopted a bill providing that transport vehicles may unload 24 hours a day. Nebraska repealed a measure prohibiting loading or unloading petroleum transports at night and on certain days of the week.

Socony-Vacuum Marine Terminal Sold to Shell

Sale of the Socony-Vacuum Oil Co., Inc., bulk-plant marine terminal at Charleston, S. C., to Shell Oil Co., Inc., has been announced. The terminal, located on Cooper River, has a capacity of 11,000,000 gal., accommodates ocean-going tankers, and has modern equipment for pumping products from tankers to storage tanks.

Socony-Vacuum officials said the unprecedented demand for products throughout all marketing areas prevented quick completion of an expansion program, of which the terminal was a part.

U. S. Plant at El Dorado Sold to Root Petroleum

WASHINGTON.—War Assets Administration has approved the sale to Root Petroleum Co., El Dorado, Ark., of the government-owned 100-octane gasoline plant operated by Root during the war and intermingled with

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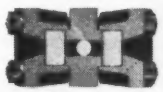

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EASY TO USE—Apply the Ucilon 400 series with brush or spray gun. It has excellent adhesion, flexibility—can be used on concrete, metal, wood. Fast drying time.

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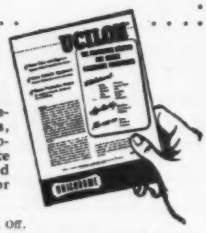

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company equipment. It includes catalytic cracking, gas concentration, isomerization, and alkylation units.

The plant cost the Government $5,579,224 and is being sold for $1,100,000 on terms of $250,000 cash, $450,000 within 3 years, and the balance on a schedule based on amount of feed stock charged to the cracking unit.

Tank-Truck Movement Of Alcohol Is Proposed

Rules proposed by the Alcohol Tax Unit of the Bureau of Internal Revenue would permit the transportation of tax-free alcohol and its by-products in tank trucks.

Resulting from a petition filed by the National Tank Truck Carriers, Inc., the proposed rules would permit transportation of denatured alcohol, specially-denatured alcohol, fusel oil, butyl alcohol, acetone, and ether in tank trucks of 2,000 gal. capacity or more. They also will authorize transportation of proprietary antifreeze solutions in tank trucks, but only for one manufacturer between the producing plant and the packaging plant.

Imperial Marks Sarnia's Fiftieth Anniversary

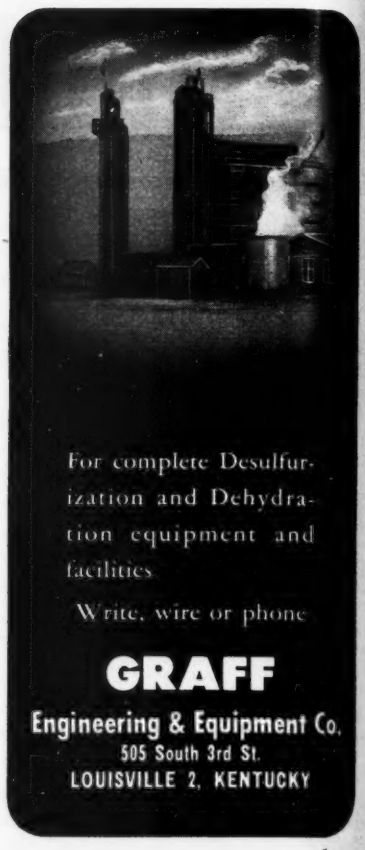
SARNIA, Ont.—A few hours before the annual meeting of Imperial Oil, Ltd., on April 28, President H. H. Hewetson attended a meeting of employes of the Sarnia refinery to commemorate the fiftieth anniversary of the first operation.

The company, originally organized at London, Ont., started operation of its Sarnia refinery in 1897. In the intervening 50 years the fires have never been drawn. The company operates refineries at Dartmouth, N. S., Montreal, Regina, Calgary and Ioco, B. C. Capital outlays in 1946 totaled more than $20,700,000.

Grease Institute Adopts New Constitution, Bylaws

A new constitution and bylaws for the National Lubricating Grease Institute was adopted by its board of directors in session in Hot Springs, Va., April 28.

The constitution and bylaws had been approved by the entire membership by letter ballot previously. The board also approved a general outline of the 1947 meeting program, to be held at the Edgewater Beach Hotel, Chicago, October 16-18. Provisions were made in the budget to take care of the enlarged Institute Spokesman which is the institute's official publication. The next meeting of the board will be June or July at Hershey, Pa., according to Carl E. Bolte, institute executive secretary.



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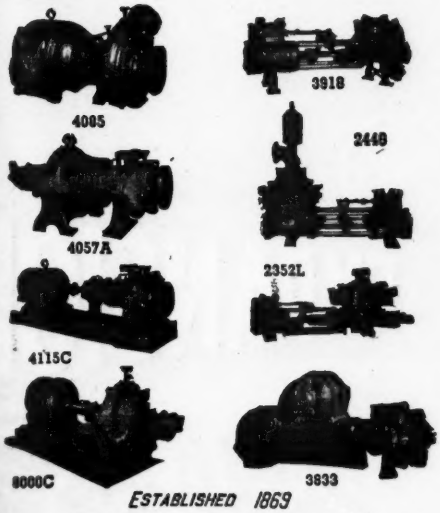

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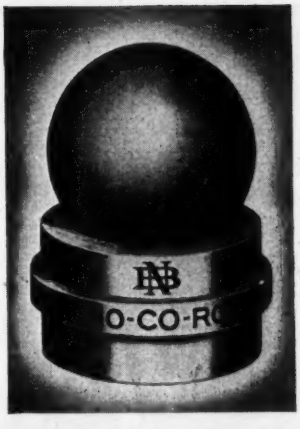

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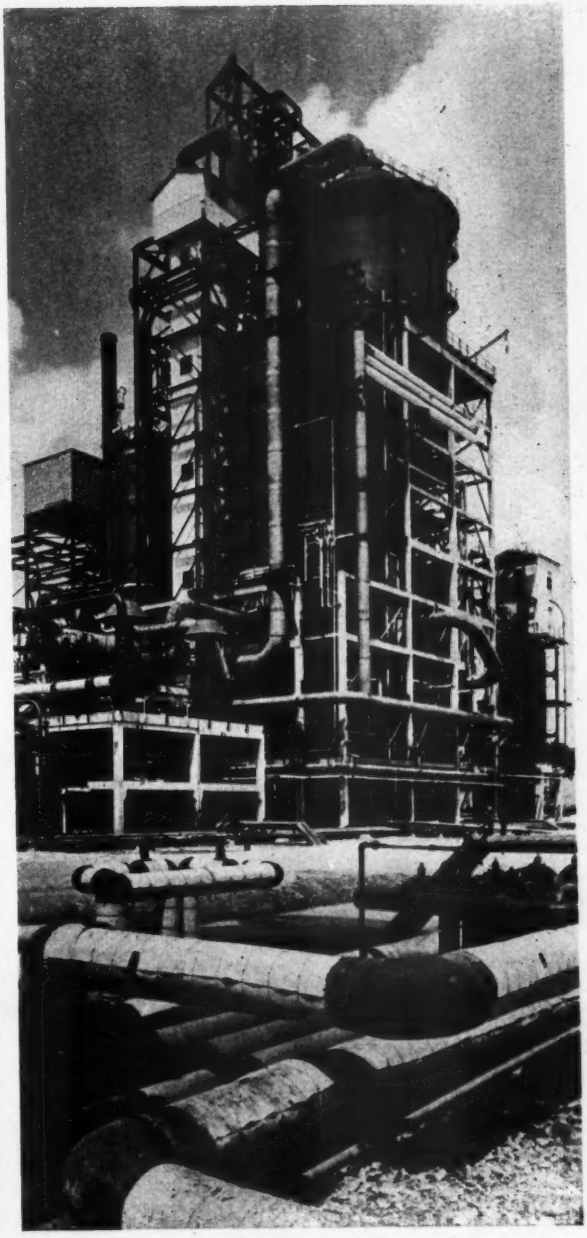

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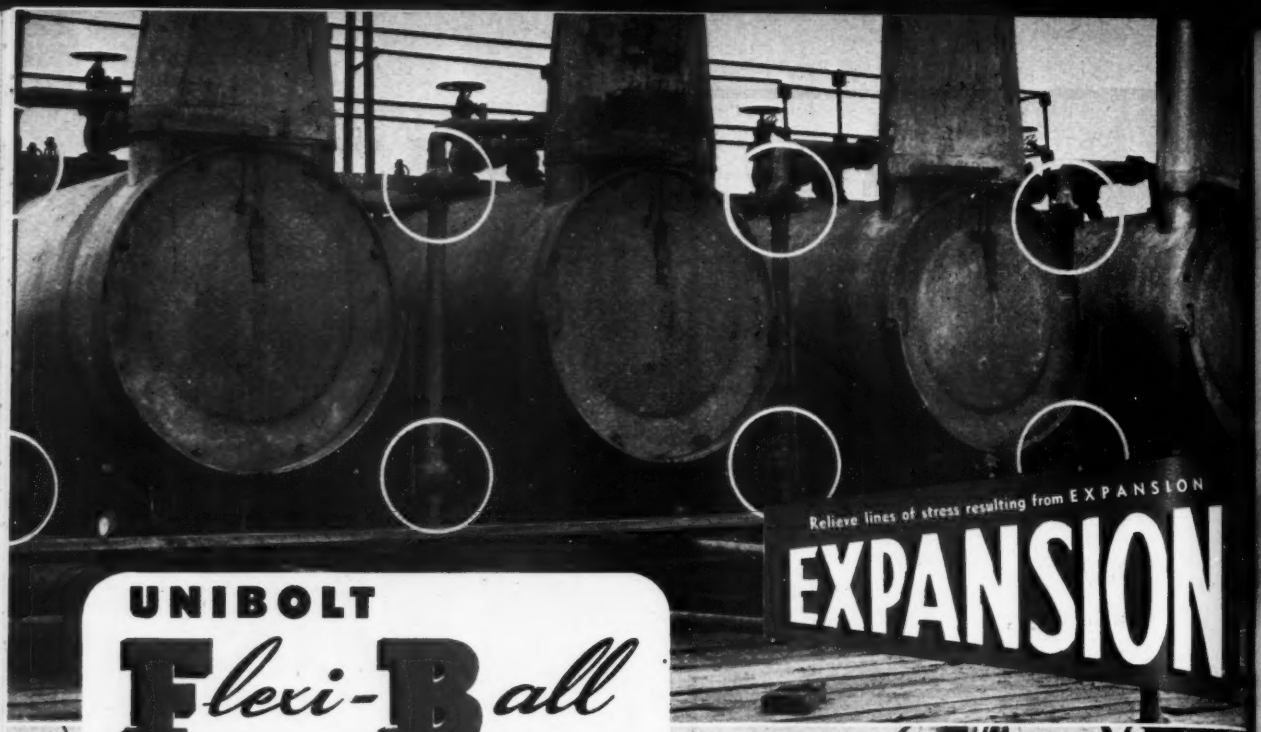

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Make up mud lines despite MISALIGNMENT

MISALIGNMENT

Prevent the damaging effect of intermittent VIBRATION

VIBRATION

PIPE LINES

B. E. Hull Establishes Office in San Francisco

B. E. Hull, president, Trans-Arabian Pipe Line Co. is establishing an office this week at 200 Bush Street, San Francisco, for the duration of the construction period for the company's pipe line to be built from Saudi Arabia to the Mediterranean Sea. The building at that address is occupied exclusively by Arabian American Oil Co. and Trans-Arabian Pipe Line Co. Hull will continue to maintain his home in Houston, although a great deal of his time will be spent in San Francisco.

Rocky Mountain to Spend $2,300,000 on Expansion

Rocky Mountain Pipe Line Co., a Continental Oil Co. subsidiary, will enlarge its Colorado-Wyoming pipe line at an estimated cost of $2,300,000, it has been announced by W. H. Ferguson, president of Rocky Mountain and executive vice president of Continental.

The expansion of the Rocky Mountain Pipe Line Co.'s activities follows the recent announcement of a $4,000,000 construction program to enlarge Continental's Denver refinery to twice its present size.

Rocky Mountain's lines now include an 8-in. line from Lance Creek to Cheyenne, Wyo., and a 6-in. line from Cheyenne to Denver. At Guernsey, Wyo., the line intersects other lines bringing crude oil from the new Rangely and Elk Basin fields, as well as lines from other Big Horn Basin and Wind River Basin fields and Salt Creek field.

The enlargement announced will include laying an entirely new 10-in. line from Horse Creek station north of Cheyenne to Denver, a distance of about 118 miles, and looping with additional 8-in. pipe a part of the line from the Guernsey station to Horse Creek. Because of the scarcity of material, the new line will not be completed until late in 1948.

When finished, the enlarged line will handle, with a minimum number of pump stations, at least 26,000 bbl. of crude a day. Later erection of additional pump stations will substantially increase the capacity beyond this figure.

PIPE-LINE PERSONALITIES

K. A. OWEN

KENNETH A. OWEN, assistant to the manager, Williams Brothers Overseas Co., will be dividing his time this year between San Francisco, Tulsa, and New York in handling the affairs of this company for the construction of part of the trans-Arabian pipe line project.

He was born at Mobile, Ala., March 4, 1908, and attended Howard College, Birmingham, Ala.; he studied accounting at South Texas School of Commerce, Houston, before entering employ of Texas Pipe Line Co. in 1934 where he was in the general accounting office until he was transferred in 1936 to become secretary to B. E. Hull, president of the company.

During the 1942-43 construction period of War Emergency Pipelines, Inc., he was executive assistant to Hull and A. N. Horne; later he was manager of oil purchases and sales until the end of operating the Big Inch lines.

In October 1945 he was employed as assistant superintendent of southwestern division of Williams Brothers Corp.; in September 1946 he became field auditor.

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Pipe Line Contractors and Engineers
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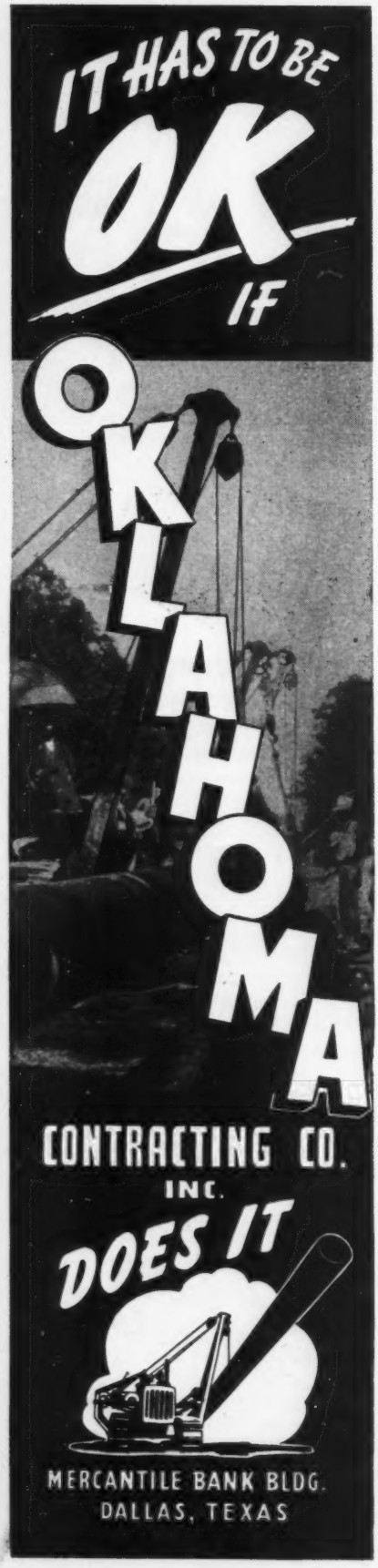
above all EXPERIENCE
Not just Contractors but
PIPE LINE SPECIALISTS



Rocky Mountain Pipe Line Co. was organized in 1938 to transport oil from the Lance Creek field to Cheyenne and Denver. The present line is 240 miles long. Continental's interest is 55 per cent.

Expansion of the Denver refinery, which will be served by the enlarged lines, will include erection of catalytic-cracking and polymerization units of the type used during the war for the manufacture of 100-octane gasoline. This expansion project is to be completed early in 1943.

Canadian Firm Is High Bidder for Canol

The Government has received a high bid of $1,500,000 for its $70,000,000 wartime crude-oil project, Canol No. 1 in Canada.

The bid, one of several opened in the office of the foreign liquidation commissioner in Washington, was submitted by the Northwest Salvage Co., Edmonton, Alta.

The second high bid, $288,888.88, was submitted by Bernstein Brothers, Pueblo, Colo., and the third, $285,074.55, by Louis Greenspon, Inc., Overland, Mo.

One of the OFL officials present for the opening of the bids commented that the "sum total of the bids is rather disappointing."

The office indicated that designation of a successful bidder, if any, would be forthcoming in "a few days." It reserved the right to reject "any and all bids."

The project, representing an actual government investment of $69,534,286, includes among other facilities a refinery at Whitehorse in Yukon Territory; a power plant and the 577-mile pipe line from Norman Wells to Whitehorse.

Canol Projects 2, 3, and 4, the system for distributing Canol's output, have not been declared surplus by the Army.

Atlantic Completes New Midland Loading Rack

The railroad tank-car loading rack at Atlantic Pipe Line Co.'s Midland, Tex., terminal was dismantled and moved to Jal, N. M., for erection and operation by Humble Oil & Refining Co.

Work of tearing the rack down had hardly been finished when orders were issued to start building a new rack at the same place.

That activity has now been finished, and Atlantic has a new facility ready for loading 50 tank cars at a time with Permian basin crude for shipment by rail to the east and southeast.

It is understood that movements of around 5,000 bbl. daily will be started at once. Information developed at the

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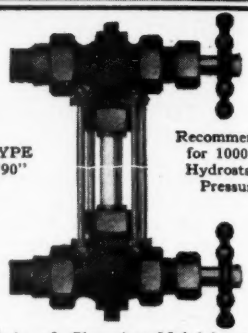

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state-wide proration hearing of the Texas Railroad Commission in San Antonio indicate there is a strong possibility that in a short time rail shipments of oil from Midland might aggregate 25,000 bbl. daily.

Americans Supervise Iraq Line Construction

More than 100 miles of the 700-mile 16-in. crude oil pipe line of Iraq Petroleum Co. from Kirkuk to Haifa has been completed, according to recent reports which state that the project is being built by Iraq workers and English and French welders directed by key construction supervisers from the United States. Recent progress is said to be at the rate of 1½ miles per day, but there have been interruptions due to irregular deliveries of materials.

One spread had been operating from H-2 camp, 360 miles west of Baghdad where personnel for a second spread is being assembled.

Supervisory personnel from the United States includes C. L. Boatman, Coffeyville, Kans., construction superintendent; A. B. Haynes, Garland, Tex., assistant superintendent; F. S. Steinwander, Laurel, Miss., welding superintendent; J. O. Hare, Oklahoma City, general foreman; Jasper Peck, Houston, pipe foreman; John Barnhill, machine foreman; and Floyd Green, chief machinist, both of Oklahoma City. Other superintendents and foremen preparing at H-2 camp for the second spread include: L. E. Reed, Neosho, Mo.; George Shroeter, Fort Worth; Cecil Beeler, Houston, and C. M. Bowden, Dallas. Within recent weeks the H-2 camp was visited by B. E. Hull, president, Trans-Arabian Pipe Line Co.

Southern Union Completes Looping in New Mexico

Southern Union Gas Co. has completed two 10-in. loops totaling 22½ miles for its system for transmitting natural gas from Barker Dome in New Mexico. The project consists of a 12½-in. mile loop near Farmington, N. M., and a 10-mile loop near Star Lake, N. M. The work was contracted by R. H. Fulton Co.

East Ohio Gas to Lay 50-Mile 20-In. Line

East Ohio Gas Co. is preparing to lay 50 miles of 20-in. from its gas-storage pool in Jackson Township, Stark County, to Brook Park, southwest of Cleveland, Ohio.

Ohio Fuel Gas Co. is engaged in laying 16 miles of 16-in. pipe in northern Ohio which has been contracted by H. L. Gentry Engineering & Construction Co.

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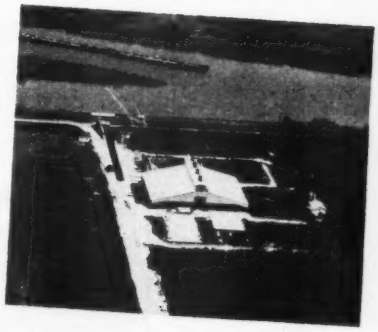

PIPE PROTECTION SERVICE AT HARVEY, LOUISIANA

Pipe Line Service Plant on Waterway Offers Additional Pipe Protection Facilities for Southern Pipe Users.

To expand its service to pipe users in the gulf coast area, Pipe Line Service Corporation's plant at Harvey, Louisiana, provides another dependable source for pipe cleaning, coating and wrapping along with storage accommodations.

Strategically located on the Intra-coastal waterway near New Orleans, the Harvey plant further provides rail, barge and truck facilities to handle all transportation requirements.

Other Pipe Line Service plants are located at Longview and Corpus Christi, Texas; Sparrows Point, Maryland; Glenwillard, Pennsylvania; and Franklin Park, Illinois. Write for new catalog describing this complete pipe protection service.

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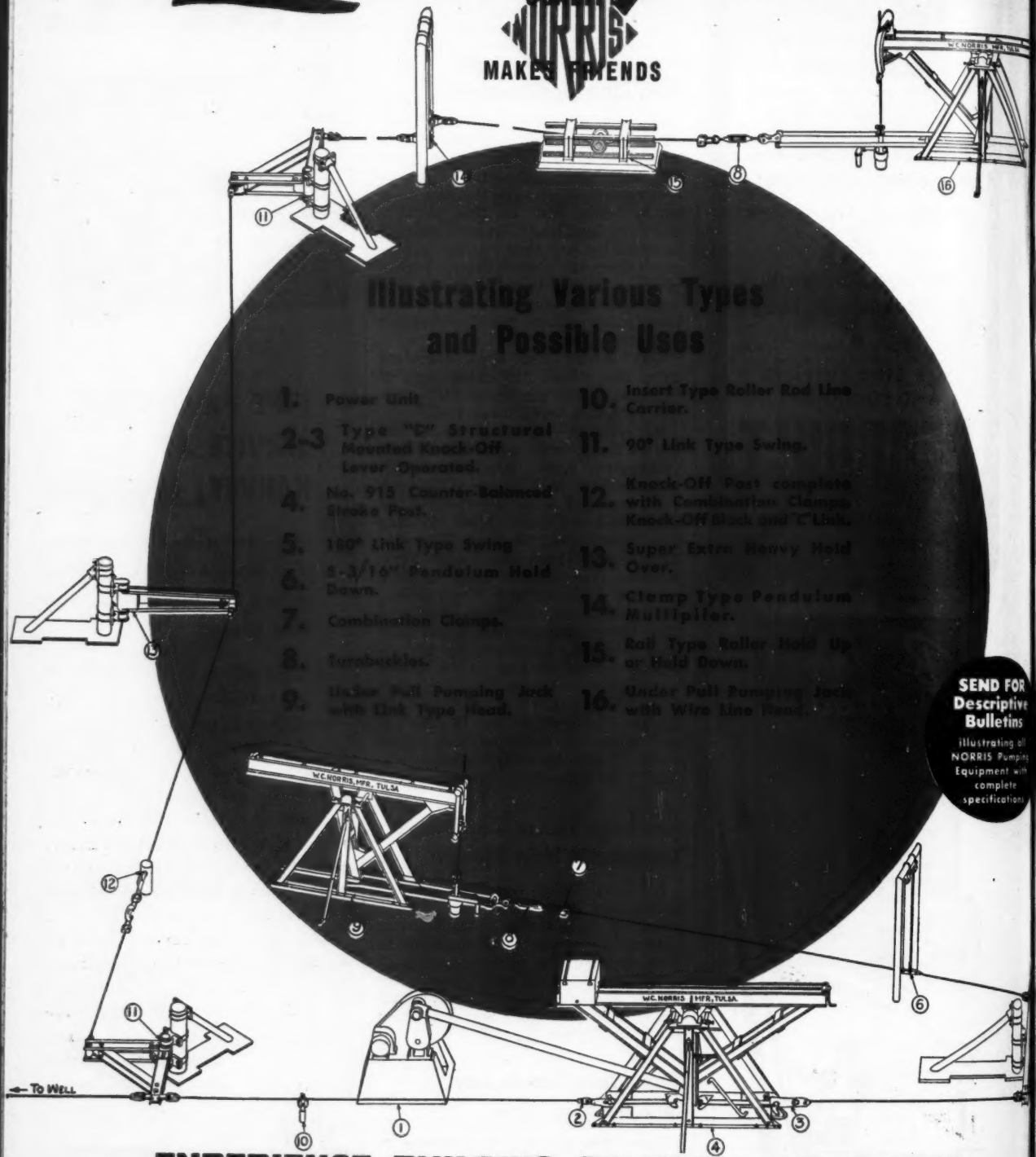

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Exploration and Drilling

Oklahoma Area Getting Hotter

THE Garvin-McClain County area in Oklahoma is the center of interest for many oil men these days, including many companies that are not now operating there. Current developments have been interesting enough, but there is a prevailing feeling that sometime during the next week or two things will really break loose.

Throughout the industry there is that certain "feeling," psychological "hunch," or what have you, that all experienced oil men recognize, even if it is hard to explain to the layman All the earmarks are there; a series of pools found; fair probability that several of them may connect up; possibilities that there may be hookups among others; or that extreme outpost wildcats will soon be producers and that even these outposts will not mark the ultimate limits of that particular pool.

Geologically the earmarks are those of an extremely rich petroliferous area, where oil accumulation is so plentiful that if one pay is too low structurally, another one is liable to come in lower in the geological section. There is evidence that while some accumulations are stratigraphic traps in sand pinchouts, these are on a regional structure, with some local structure involved. Furthermore, there is some evidence that accumulation of oil is so prevalent throughout the geological section that perhaps deep structural oil is a good probability off the edge of the shallower pinchouts in upper sands.

More specifically, this past week saw Wayne pool get its fourteenth producer. It also got a 1-mile west extension from the previous northwest outpost well. This northwest outpost well had a ¾-mile gap to the main pool, and a well was completed midway in that gap. The original northwest outpost well was in SE NE NW 14-5n-2w; the west extension well is in NW NW 15-5n-2w; and the gap filler is in NW SE SE 14-5n-2w.

Meantime Carter Oil Co. 1 Helvey, SW NW 25-2n-2w, potential connection between Elmore City and Katie pools, and perhaps just one more link in what may be one big field extending from Antioch to Katie, and perhaps farther south, is held up by a fishing job, almost on top of the pay.

The Lindsay trend play, where production has already been proven in the Viola, Hunton, and Ordovician bromide, and drill-stem indications in the shallower Pennsylvanian sands, is getting more tense. These are extremely deep and expensive tests, yet there is talk of a joint venture to try a 4-mile northwest extension shot. This is deep, highly faulted territory, but four pools have been opened here since July 1945.

A little farther west, in southern Grady County, Magnolia Petroleum Co. 1 Boatright found 45°-gravity oil instead of distillate in the deep Chitwood pool. Since a new shallow oil pay was found in the old Knox field, one township southeast, apparently establishing a northwest southeast trend, this has set off another hot play.

There is a cumulative buildup from these strikes. But there is something more, because the feeling of something big about to break is prevalent among oil men who are not even following the area closely enough to name the wells they expect to open the show.

EASTERN TEXAS

Magnolia Well in Lassiter Field, Marion Co., Is Testing

DALLAS.—Magnolia Petroleum Co. 1 Hall Estate, Smackover test in Lassiter field, Marion County, took a second drill-stem test in the Travis Peak at 7,995-8,010 fit. With packer set at 7,880 ft., it produced a blow at the surface in 20 minutes, but with little surface pressure. Operators went in with swab and after six runs, fluid stood 5,500 ft. from the top. Pulling off bottom, recovery was drilling mud with some gas. The tool was pulled after 6 hours and 25 minutes, recovering 450 ft. of wash water and drilling mud, with slightly salty taste. Operators were testing new perforations a 7,822-24 ft.

Boynton, Paluxy sand field, of northern Smith County, had shows of an extension at Phillips Petroleum Co. 1 Opal. The northeast outpost topped the Paluxy at 7,415 ft. and showed some oil between 7,463-66 ft. Operators were drilling ahead below 7,675 ft., without testing the section.

In Henderson County, Gulf Oil Corp. completed 1 Laco Oil Co. for 49 bbl. of 44.3°-gravity oil a day through 15/64-in. choke, from the Rodessa at 8,756-8,805 ft. Flowing tubing pressure was 245 lb., with gas-oil ratio of 3,600:1. It marks a 6,000-ft. west extension to Opelika field and opens considerable acreage to further exploration. On the field's southwest flank, Blackwell Oil & Gas Co. 1 Burnett, in the South Anglin Survey, was drilling ahead after topping the James limestone at 9,013 ft., on an elevation of 447 ft. Operators had drilled through the "H," or pay zone of the Rodessa, and had hopes of finding production in the James. Operators were to run electric survey.

Considerable interest has been shown in both the 1 Laco and the 1 Burnett tests. The 1 Laco, located 4,100 ft. north of 1 Burnett, was reported to have shown some porosity in the James limestone, but carried water. The Blackwell test has checked slightly higher than the 1 Laco.

EAST TEXAS WILDCAT FAILURES

Collin County: Humble Oil & Ref. Co. 1 J. W. Wester, A. J. Culwell Sur., 2 mi. S Weston, dry, TD 7,850 ft., sample tops: Comanche 1,117 ft., Paluxy 1,757 ft., Glenrose 2,372 ft., Pennsylvanian red beds 3,079 ft., elev. 710 ft.

Houston County: W. M. McMurray et al 1 C. C. Smith, Jesse G. Thompson Sur., 18 mi. W Grapeland, dry, TD 5,950 ft., Pecan 4,334 ft., Austin 5,368 ft.

MISSISSIPPI

Jasper County to Get 12,000-Ft. Test

JACKSON.—Danciger Oil & Refining Co. last week was reported planning a 12,000-ft. test on the Heidelberg structure, on the graben area between East and West Heidelberg, in NE NE 36-1n-12e, Jasper County. Location is on the C. J. Simmons tract, a farmout of acreage from Gulf Refining Co. It is also ½ mile south and ¼ mile east of a dry upper Tuscaloosa test drilled by Gulf.

In Clay County, Atlantic Refining Co. 1 R. G. Dunning, a 9,000-ft. test in NW SW 12-12n-16e, was drilling below 6,604 ft. on last report. Operators expect to reach the Mississippi limestone around 7,000 ft. R. L. Fisher et al 1 Harmon, Eutaw test in SE SW 24-6n-6e, Scott County, was drilling below 4,547 ft. in chalk, topped at 4.485 ft. Other tops were Winona 1,250 ft., Wilcox 1,550 ft., and the Midway at 3,830 ft., on an elevation of 484 ft.

Phillips Petroleum Co. 2 Mrs. Vic Artman, Massive sand test in the Pine Ridge field, Adams County, and an east offset to the 1 Artman, discovery well for Pine Ridge Wilcox production, was a failure at 10,266 ft. The 2 Artman was said to be running some 8 ft. high on top of the Wilcox but thickened within the section. to find the producing sand approximately 7 ft. below the water table. Electric log tops were: Winona 3,849 ft., Wilcox 3,990 ft., Midway 7,447 ft., Selma 8.396 ft., Austin 8,993-9,288 ft., Tuscaloosa 9,447 ft., Marine Tuscaloosa 9,817 ft., Massive sand 10,149-206 and 10,224-265 ft., Comanche 10,265 ft.

6 CARBON BLACK PLANTS NOW FOR SALE OR LEASE

These 6 big-capacity, channel-type carbon black plants are strategically located with respect to sources of the adequate gas supplies essential to their operation.

War Assets Administration invites proposals for the purchase or lease of these six plants.

Machinery and equipment in each consists of special production units for the manufacture of channel-type carbon black including burners, scrapers, conveyers, pulverizers, loading and bagging equipment, and machine shop and laboratory equipment.

These six plants are capable of producing 20% of the total U.S. industrial production of channel black per year, 650,000,000 pounds. Subject to the terms of offer, they might well be purchased for use here, or for removal to South American or overseas sites to serve the industry abroad.

Credit terms may be arranged for the purchase of these plants.

War Assets Administration reserves the right to reject any or all proposals or offers received.

1. MONUMENT, NEW MEXICO

(Plancor 2254)

CHARLES ENEU JOHNSON & CO.

Buildings and Facilities: Gas Desulphurization (Treater) Plant, designed capacity—21 million cubic feet of gas per day, Gas Supply Line, Carbon Black Plant—2 Burner Units, each consisting of 40 Burner Houses, 12′ x 160′ x 9′. Processing, storage and miscellaneous accessory buildings and equipment—2 incomplete Burner Units with most of material for 32 Burner Houses each, and dwellings (14) near Carbon Black Plant Site.

Land: Approximately 175 acres.

For Sale or Lease—(A) As a whole, for operation at present location; (B) less either one or both of the incomplete burner units for operation at the present location, or—

For Sale—(C) As a whole, except dwellings, for dismantling and removal from site; (D) either one or both of the incomplete burner units for dismantling and removal; (E) dwellings only, if remainder of plancor is sold on a removal basis.

Gas Supplies: Gas is now being supplied by Warren Petroleum Company under a contract with present lessee.

For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, Commonwealth Bldg., 728 15th St., Denver, Colo.

2. EUNICE, NEW MEXICO

(Plancor 2253)

PANHANDLE CARBON COMPANY

Buildings and Facilities: Gas Desulphurization (Treater) Plant, designed capacity—30 million cubic feet of gas per day, Gas Supply Line, Carbon Black Plant—4 Burner Units, each consisting of 42 Burner Houses, 12′ x 160′ x 9′. Processing, storage and miscellaneous accessory buildings and equipment. Dwellings, 4 at Treater Plant Site, 14 near Carbon Black Plant Site. Total all buildings, 357,948 sq. ft.

Land: Approximately 148-1/2 acres.

For Sale or Lease—(A) As a whole, for operation at present location; (B) as a whole less 2 burner units and appropriate accessory buildings and equipment for operation at the present location, or—

For Sale—(C) As a whole, except dwellings, for dismantling and removal from location; (D) 2 burner units only and their appropriate accessory buildings and equipment for dismantling and removal from site; (E) dwellings to be offered separately if remainder of plancor is sold for dismantling and removal.

Gas Supplies: Gas is now being supplied by Phillips Petroleum Company under a contract with the present lessee that extends through 1949.

For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, Commonwealth Building, 728 Fifteenth Street, Denver, Colorado.

3. SEAGRAVES, TEXAS

(Plancor 2316)

COLUMBIAN CARBON COMPANY

Buildings and Facilities: Gas Desulphurization (Treater) Plant, designed capacity—21 million cubic feet of gas per day, Gas Supply Line, Carbon Black Plant—3 Burner Units, each consisting of 60 Burner Houses, 12′ x 116′ x 9′. Processing, storage and miscellaneous accessory buildings and equipment. Dwellings—4 at Treater Plant Site and 15 near Carbon Black Plant Site.

Land: Approximately 235-3/4 acres.

For Sale or Lease—(A) As a whole, for operation at the present location; (B) as a whole less 1 or 2 burner units and appropriate accessory buildings and equipment, for operation at the present location.

For Sale—(C) As a whole, except dwellings, for dismantling and removal from site; (D) either 1 or 2 burner units and appropriate accessory buildings and equipment for dismantling and removal from site; (E) dwellings to be offered separately if remainder of plancor is sold for removal from site.

Gas Supplies: Gas is now being supplied by Phillips Petroleum Company and in part by an affiliate of the present lessee, Columbian Carbon Company. The contract with Phillips Petroleum Company extends through 1949 and is transferable with the plancor. Columbian Carbon Company has expressed willingness to negotiate with prospective operators of the plant for such small additional supplies of gas as the company may have over and above its own needs.

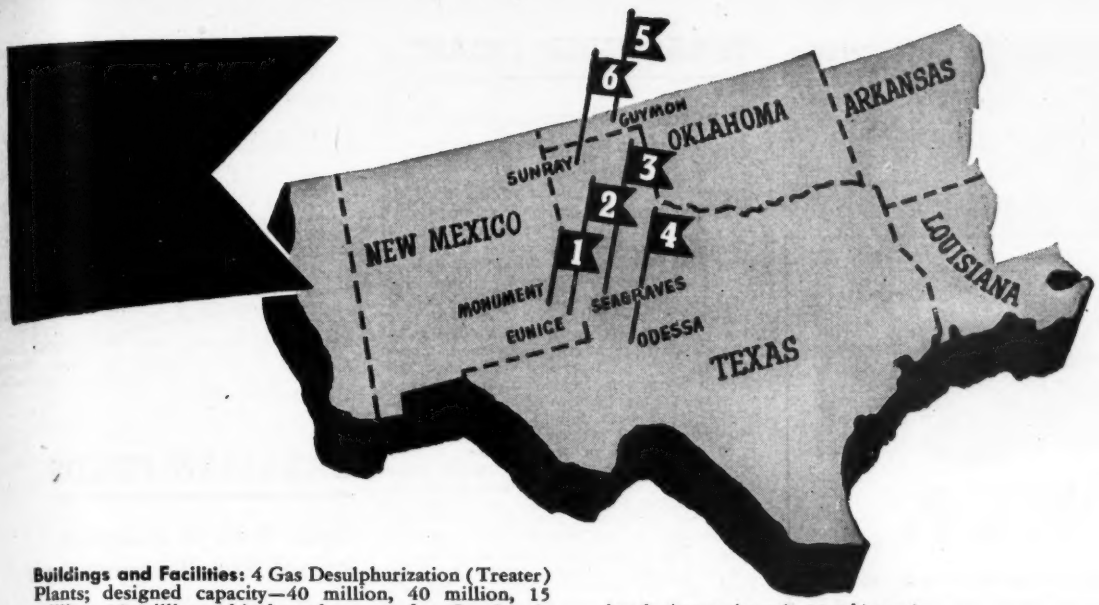
For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, North American Aviation Plant, Grand Prairie, Texas.

4. ODESSA, TEXAS

(Plancor 2279)

UNITED CARBON COMPANY

(Subject to an interim lease held by United Carbon Co. expiring December 31, 1947.)



Buildings and Facilities: 4 Gas Desulphurization (Treater) Plants; designed capacity—40 million, 40 million, 15 million, 10 million cubic feet of gas per day. Gas Supply Lines—2 complete Carbon Black Plants. No. 1—one Burner Unit, consisting of 44 Burner Houses, 12′ x 144′ x 9′ and 3 Burner Units, each consisting of 44 Burner Houses, 12′ x 148′ x 9′. Processing, storage and miscellaneous accessory buildings and equipment. No. 2—4 Burner Units, each consisting of 60 Burner Houses 12′ x 148′ x 9′. Processing, storage and miscellaneous accessory buildings and equipment, and one incomplete, partially erected Carbon Black Plant. No. 3—most of material for 2 Burner Units, each consisting of 60 Burner Houses, 12′ x 148′ x 9′. Most of material for processing, storage and accessory buildings and equipment. Dwellings—4 at each Treater Plant Site and 72 at Odessa, Texas.

Land: Approximately 425-3/4 acres.

For Sale or Lease—(A) As a whole, for operation at the present location; (B) as a whole, less incomplete Plant No. 3 at present location; (C) any appropriate combination of treater plants, burner units, accessory buildings and equipment for operation at the present location.

For Sale—(D) As a whole, except dwellings, for dismantling and removal; (E) incomplete Plant No. 3 for dismantling and removal; (F) any appropriate combination of treater plants, burner units, accessory buildings and equipment for dismantling and removal from site; (G) dwellings to be offered separately if remainder of plancor is sold for removal.

Gas Supplies: Gas is now being supplied by Phillips Petroleum Company, Cities Service Oil Co., and Odessa Natural Gasoline Co., under contracts with the present lessee that run through 1949 with contingent extension.

For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, North American Aviation Plant, Grand Prairie, Texas.

5. GUYMON, OKLAHOMA
(Plancor 2317)
CABOT CARBON COMPANY

Buildings and Facilities: 4 Burner Units, each consisting of 48 Burner Buildings, 13′ x 124′ x 15′. Other buildings, Processing Shop, Warehouse and Service Buildings and equipment, 20 frame dwellings.

Land: Approximately 59-1/4 acres.

For Sale or Lease—(A) As a whole, for operation at present location; (B) less 2 burner units and accessory buildings and equipment for operation at present location, or—

For Sale—(C) As a whole, except dwellings, for dismantling and removal from site; (D) 2 burner units, appropriate buildings and equipment for dismantling and removal; (E) dwellings only, if remainder of plancor is sold on a removal basis.

Gas Supplies: Gas is now being supplied through facilities of the Gas Division of Cabot Carbon Company. Cabot Carbon Co., has expressed willingness to negotiate with prospective operators of the plant for necessary gas supplies.

For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, 2000 N. Memorial Drive, P.O. Box 1409, Tulsa, Okla.

6. SUNRAY, TEXAS
(Plancor 2277)
CONTINENTAL CARBON COMPANY

Buildings and Facilities: 6 Burner Units, 4 consisting of 42 Burner Houses each, 12′ x 160′ x 9′, 1 of 40 Burner Houses and 1 of 20 Burner Houses. Processing, storage and miscellaneous accessory buildings and equipment. 14 dwellings near Carbon Black Plant. Total all buildings, approximately 475,777 sq. ft.

Land: Approximately 155 acres.

For Sale or Lease—(A) As a whole, for operation at present location; (B) as a combination of burner units plus appropriate accessory buildings and equipment for operation at the present location, or—

For Sale—(C) As a whole, except dwellings, for dismantling and removal from site; (D) any combination of burner units plus appropriate accessory buildings and equipment for dismantling and removal from site; (E) dwellings to be offered separately if remainder of plancor is sold for removal from location.

Gas Supplies: Gas is now being supplied by Shamrock Oil and Gas Corporation under a month-to-month contract with the present lessee.

For a more detailed description of this property write: War Assets Administration, Office of Real Property Disposal, N. American Aviation Plant, Grand Prairie, Texas.

Prospective lessee or purchaser should arrange to obtain his own gas supplies. 1125-T

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Dept. O, Hotel Colorado
Glenwood Springs, Colo.

TEXAS GULF COAST

Amerada Bloomington Field Discovery Flows 157 Bbl.

HOUSTON.—The Bloomington field discovery, Amerada Petroleum Co. 1 Alexander unit, in southeastern Victoria County, is being completed for a potential gage of 157 bbl. of clean oil per day through a 5/32-in. choke, with 675 lb. tubing pressure. Gravity of the oil is 22.3° and is flowing through perforations at 4,904-09 ft. Total depth is 6,921 ft. with 5½-in. casing set at 4,973 ft. Tests in the upper sand, topped at 4,635 ft., flowed oil and salt water. This new discovery is located in the F. Perez Survey, 1 mile northwest of Heyser field.

Also in Victoria County, Amerada 1 Eliz. Mueller, wildcat Wilcox test, approximately 5 miles west of Nursery and 3 miles southeast of Mission Valley, in Eli Stapp League, is running production tests. The 5½-in. casing has been set on bottom at total depth of 9,916 ft. and tests are through perforations in the Wilcox zone, topped at 8,730 ft. No details have been reported.

A new producing area, off the southeast flank of the Manvel dome in Brazoria County, has been opened by Progress Petroleum Corp. 1 O. L. Rash et al, located in the Thomas Spraggins Survey, ½ mile from production. On potential test flowed 134 bbl. of 26°-gravity pipe line oil per day through a ⅛-in. choke with 500 lb. flowing pressure on tubing and 900 lb. casing pressure. Gas-oil ratio was 235. Total depth is 5,640 ft. with 5½-in. casing cemented to 4,644 ft. Production is through perforations at 4,590-94 ft.

New deep gas-condensate production for the Scoby Lake discovery area, 1½ miles south of Blue Lake production in Brazoria County, has been opened by McCarthy Oil & Gas Corp. 1 T. A. Munson et al, located in the Cornelius Smith League, 5,400 ft. northwest of the Mary B. Nickell 1 discovery. On potential test gaged 4,620,000 cu. ft. of gas along with 44 bbl. of 50.2°-gravity green condensate daily through a ¼-in. choke, through perforations at 10,488-504 ft., gas-condensate ratio 105,000. Open flow calculation is 21,500,000 cu. ft. of gas daily. The discovery well was completed for an estimated 75 bbl. of condensate and 3,500,000 cu. ft. of gas through perforations at 9,100-10 ft., with total depth of hole 12,007 ft.

Ryan Consolidated Petroleum Co. 1 Theresa H. Wagener, discovery well of Green Lake field in Calhoun County, 2 miles east-northeast of the Green Lake townsite, and 2⅔ miles southwest of Sheriff field, in Manuel Lopez Grant, flowed several million cubic feet of gas and considerable condensate through perforations at 5,928-38 ft., with no accurate gage made. Operators then drilled out part of the bridge plug set at 5,950 ft., to reperforate for additional testing at 5,950-54 ft.

There were 29 new locations reported this week with 6 being wildcats, 1 each in Bee, Chambers, Galveston, Harris, Montgomery, and Orange counties. The 26 completions included 18 oil, 1 condensate, 1 gas, and 6 dry holes. One new oil pool was opened in Brazoria County and one new gas pay for North Vidor pool was opened in Orange County while four wildcats were dry, one each in Brazoria, Fort Bend, Montgomery, and San Jacinto counties.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Brazoria County: New oil discovery, SE flank of Manvel field—Progress Pet. Co., Inc., 1 O. L. Rash et al, in Thos. Spraggins Sur., TD 5,645 ft., oil sand 4,590-4,604 ft., perf. 4,590-94 ft., IP: 133 bbl. oil per day through ⅛-in. choke, gas-oil ratio 235, TP 500 lb., CP 900 lb., gravity 25.4°, no water.

Orange County: New gas pay North Vidor pool—Gulf Oil Corp. 1 Miller-Vidor Land Co. et al, in J. M. Swisher Sur. 1, TD 8,010 ft., top sand 6,932 ft., perf. 6,932-34 ft., IP: flwd. dry gas and shut in, no gage, TP 2,640 lb., no water.

TEXAS GULF COAST WILDCAT FAILURES

Brazoria County: General Crude Oil Co. 9 Belle H. Wisdom, Damon Mound area, in Abraham Darst Sur., dry, TD 3,986 ft.

Fort Bend County: Jack W. Frazier 1 A. P. George, in Smithers Lake area, 3¼ mi. W of No. Thompson field, in A. D. Kelker Sur., dry, TD 5,583 ft.

Montgomery County: W. F. Newton 1 Montgomery County, in J. Montgomery Sur., 5 mi. NE of Conroe, dry, TD 8,030 ft.

San Jacinto County: Phil Harris and Alice Faye 1 Mill Estate, in Vital Flores Sur., 4 mi. SW of Evergreen townsite, dry, TD 8,002 ft.

CANADIAN FIELDS

Shell Well in Jumping Pound Area Running Low

CHATHAM.—In the Jumping Pound area of the Alberta foothills, west of Calgary, Shell 5-7-1, LSD 5, 7-25-4w4, got the Madison limestone contact at 9,973 ft. and has cemented 7-in. casing at 9,800 ft., preparatory to drilling into production. The well is reported logging about 95 ft. lower than Shell 4-24-J discovery, which got a heavy wet-gas flow in the top of the limestone.

Leduc.—In the Leduc area, southwest of Edmonton, Imperial-Leduc 2, LSD 1, 16-39-26w4, is below 5,109 ft. and has passed the depth of 5,066 ft. where Imperial-Leduc 1, the discovery well, got commercial production of light crude in the Devonian limestone. Completion has been delayed by equipment breakdowns, but initial drillstem tests proved negative. Imperial 3, LSD 10, 26-50-26w4, is below 4,706 ft. and Imperial 4, LSD 16, 15-50-26w4, is below 4,304 ft. Imperial 5 has location in LSD 8, 21-50-26w4, immediately east of the discovery well.

Keystone Valley.—Definite completion of Roxana 4-K, LSD 1, 31-26-6w5, on the Keystone Valley structure in the foothills northwest of Calgary, is in sight. The test is in the Blairmore formation below 7,832 ft. with Madison limestone contact expected around 9,400 ft.

Pincher Creek.—An important new test has started in the Pincher Creek area of the southern foothills, just north of the Montana boundary, where Gulf Oil Corp. 1, LSD 15, 24-3-29w4, has spudded. Contract calls for drilling 13,000 ft. if necessary.

Lloydminster.—In the Alberta end of Lloydminster field, Commoil-Lloyd 4, LSD 11, 10-50-1w4, finished at 2,092 ft., pumped initial production of 45 bbl. West End 1, LSD 15, 11-50-2w4, bottoming at 2,012 ft., is testing. West End 2, NE LSD 16, 10-50-2w4, finished at 2,003 ft., with lower Cretaceous at 1,840 ft., and Sparky oil sand at 1,999 ft., is testing. Superior 3, LSD 5, 14-50-2w4, is testing around 1,997 ft. Commoil-Lloyd 3, LSD 6, 10-50-1w4, bottoming at 1,953 ft., is pumping, with initial production unreported. Dalo 2, LSD 9, 15-50-2w4, bottoming at 1,989 ft., is standing cemented. Dimsdale 1, LSD 2, 14-50-2w4, finished at 1,990½ ft., is on the pump. Practically all these completions are in the northwest extension of the field.

In the Saskatchewan end of the field, Ace 1, NE LSD 6, 35-48-28w3, at 1,947 ft., with lower Cretaceous at 1,696 ft., Sparky sand at 1,882 ft., and General Petroleums sand at 1,922 ft., are testing, with 22 and 12 ft. of saturation respectively. Ace 2, NW LSD 3, 7-49-27w3, finished at 1,880 ft., with lower Cretaceous at 1,698 ft. and Sparky sand at 1,866 ft., is testing. Command-Globe 2, NE LSD 8, 15-47-27w3, finished at 1,871 ft., with Sparky sand at 1,849 ft., showed

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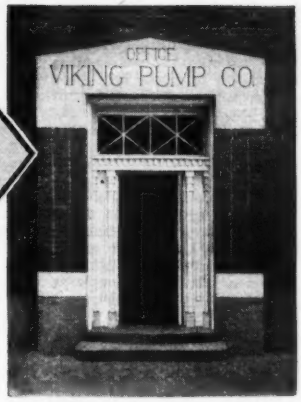

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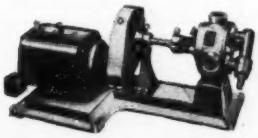

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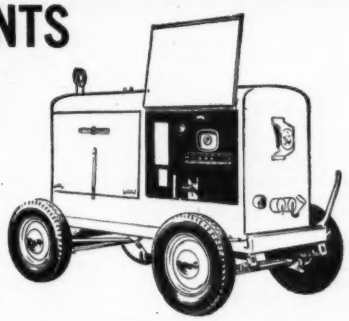

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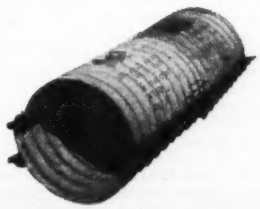

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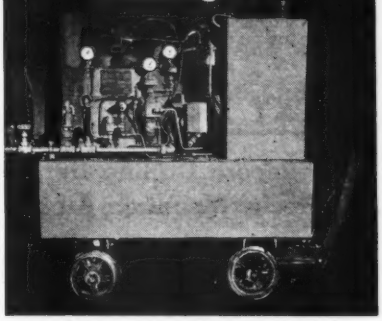

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Turner Valley.—In the Turner Valley north extension, Royalite Oil 86, LSD 12, 3-21-3w5, finished with first Madison contact at 8,951 ft. and recurrence of limestone after faulting at 9,105-10,145 ft., has been abandoned after tests showed salt water with oil in the porous horizons.

ROCKY MOUNTAIN

New Record Drilling Depth For Rocky Mountain Area

DENVER.—A new record for deep drilling in the Rocky Mountain area was established the past week when Mountain Fuel Supply Co. 3 Unit, NE SW NE 12-16n-118w, Church Buttes field, Unita County, Wyoming, was coring more than 100 ft. below 12,894 ft., the former record. No. 3 Unit is located 1½ miles west of 1 Unit, the discovery well, which was completed last year at the last-named depth. It began spudding August 2, 1946, and drilled to 12,929 ft. in approximately 8 months overall time. At this depth the bottom of the hole is approximately 5,853 ft. below sea level. The discovery well took 14½ months' drilling time, including time consumed in changing rigs and testing. The power rig on No. 3 Unit is a National 125 installation with four Superior G6-10, 410-hp. gas engines, which drive both the draw works and rotary and two mud pumps from the engine compound. It is described in detail in a special article by Neil Williams on page 61 of The Journal of February 8, 1947. The No. 2 Unit, located 5 miles northeast of the discovery, was coring below 12,444 ft. at last reports. It is using the steam rig with which the discovery was drilled. The Rocky Mountain Drilling Co. has the contract. Both wells are coring all the way below 11,000 ft.

The two drilling wells, like the discovery, are tight holes, and various rumors circulated cannot be traced to any reliable sources. The first official information concerning results in the discovery well in SW NW 8-16n-112w, completed 1 year ago, was released the past week in a report to company stockholders. It states that during testing operations, the well flowed through a ⅞-in. choke in 2½-in. tubing at the rate of 34,385,000 cu. ft. of gas per day with a surface flowing pressure of 1,500 psi., and produced condensate at a rate of approximately 215 bbl. per day. The shut-in pressure is 5,550 psi., and the caiculated bottom-hole pressure is approximately 7,100 psi. The unitized block comprises 49,838 acres, with a division of 25,646 acres, or 51.5 per cent, to Mountain Fuel Supply Co., and 24,192 acres or 48.5 per cent, to the Union Pacific Railroad Co.

Reagan extension in Montana.—Montana Power Co. 1 Tribal-355, SE SE SW 10-37n-7w, in the Blackfeet Indian Reservation, 1¾ miles south of the Canadian border, Reagan District, Glacier County, Montana, has resumed operations after being shut down for the winter, and is a near completion. It spudded August 18, 1946, and was drilled to 3,697 ft. in December when it was shut down until spring. It had the top of the Madison at 3,694 ft., and suspended drilling 3 ft. in that formation. Operations were resumed with cable tools and, at last report, was drilling at 3,721 ft. and showing for 10,500,000 cu. ft. of gas per day. The test is on a block of 7,560 acres of tribal and allotted Indian land, all of which lies to the west of the present producing area of the Cut Bank field. The location of the well is 2 miles north of Ed Reagan 1 Tribal-194, SE NE 22-37n-7w, a discovery in 1941 which made 6,000,000 cu. ft. per day from the Madison at 3,835-69 ft., but subsequently was completed as a small oil well after shutting off the gas.

Crook's Gap extended.—Sinclair-Wyoming Oil Co. 7 Creek's Gap Unit, NW NW NE 13-28n-93w, Crook's Gap field, Fremont County, Wyoming, extended the proven area in the Lakota sand ¾ mile to the northwest of No. 2 Unit, the nearest producer, and also opened up a new producing horizon in the Muddy sand. No. 7 Unit was completed at 5,320 ft., total depth, and flowed 748 bbl. of oil in 24 hours from the Lakota through perforations at 5,105-5,210 ft., and 397 bbl. in 12 hours from the Muddy through perforations at 4,955-67 ft.

New operations.—Twenty-six new operations, the largest number in any week this year, were reported, of which 12 were in Colorado, 6 in Wyoming, and 8 in Montana. These included three wildcats in Colorado and two in Wyoming. Eight of the Colorado operations were development wells in Rangely, two by Texas Co., one by Phillips Petroleum, one by Stanolind Oil & Gas Co., and four by California Co., and one in the Chromo area. The Colorado wildcats were Skelly Oil Co. 1 Pressey, NW NW NW 24-26s-63w, Rattlesnake Butte area, Huerfano County, on the Apishipa high; Ohio Oil Co. 1 Bragg, SE SE NW 29-27s-45w, Two Buttes district, Prowers County, and Wycomo Oil Co. 1 State, NW SW SE 16-11s-75w, Hartsel District, Park County. The Ohio location is its second test on a 60,000-acre block, and is located 2 miles east of the other, which was abandoned at 5,450 ft., after testing the Arbuckle, and which had several shows of gas. The old Chesapeak well, which was drilled near a volcanic plug, was located between the two Ohio tests, the Bragg well being on the east side. The Wycomo Oil Co. test at Hartsel is located 660 ft. north and 660 ft. east of South Park Oil Co. 1 State, which was abandoned in 1937 at 5,705 ft. after losing the hole. This well developed a flow of 2,880,000 cu. ft. of gas at 4,528-58 ft., which was exhausted during a long shutdown, but which had 2,700 ft. of oil in the hole upon resuming operations. The hole was lost when it was shot.

Wyoming new operations included two in the Spence field, one at Mush Creek, one at Quealy, and two wildcats. The Quealy operation is California Co. 5 Wilson, C W½ SW 18-17n-76w, ½ mile east of 2 Holst, a recent discovery in the Tensleep sand, a deeper pay. One of the wildcats is Stanolind Oil & Gas Co. 1-Shoshone-Tribal, NW SE NE 4-1n-1w, North Sage Creek, Fremont County. It is 4 miles south of the Winkelman field, and 10 miles south of Pilot Butte. It lies just north of Sage Creek, which has two small producers, and where all horizons have been tested down to the Madison at 1,900 ft. The other wildcat is Superior Oil Co. 1 Kimball Community, NW SE NE 27-3n-1w, Pilot Butte field, Fremont County. It is on the southeastern flank and will test through the Dakota series. Location is ¾ mile southeast of a gas well drilled in 1931 which made 81,928,000 cu. ft. per day in the Muddy sand at 3,565-3,625 ft., a Kinney-Coastal Oil Co. operation. The Superior test is being drilled down flank to test oil possibilities.

New Montana operations include four in Kevin-Sunburst, and one each in Pondera, Cut Bank, Bowdoin, and Whitlash fields.

COLORADO WILDCAT FAILURE

Chromo, Archuleta County: Oriental Ref. Co. 1 Elwell, C SE SW 4-32n-1e, TD 898 ft., water in Dakota at 892 ft., no show in Greenhorn lime, plugged and abd.

WYOMING SUCCESSFUL WILDCAT

South Baggs, Carbon County: Kerr-McGee-Phillips Pet. Co. 1 Unit, C SE SE 10-12n-92w, TD 9,512 ft., top Mancos shale 9,265 ft., PBTD 4,212 ft., perf. 3,771-81, 3,322-30 and 3,449-60 ft., packer set at 3,750 ft., initial production 37,500 cu. ft. of gas per day, no water, no oil from upper two zones. Lower zone flowing through casing, 5 bbl. water per hour.

UTAH WILDCAT FAILURE

West Vernal, Uintah County: Carter Oil Co. 1 Davis, C NW NW 33-4s-20e, TD 8,001 ft., flowed est. 300,000 cu. ft. per day dry sweet gas at 5,818-70 ft., after acid, leveled off to 168,000 cu. ft., bottom-hole pressure 1,060 psi. after shut in 9½ hours. Prep. to abd.

APPALACHIAN FIELD

Poca Dist. Oil Well, West Va., Makes 25 Bbl. in 2½ Hours

PITTSBURGH.—In Poca district, Kanawha County, West Virginia, in the new Big Lime oil pool which is being extended, Columbian Carbon Co. completed 4-A H. H. Parsons at 1,748 ft. which, it is reported, produced 25 bbl. the first 2½ hours. The No. 3, completed about a month ago, was good for better than 35 bbl. a day, initial, along with 200,000 cu. ft. of gas.

In Ripley district, Jackson County, United Fuel Gas Co. completed 5,832 J. M. Hall

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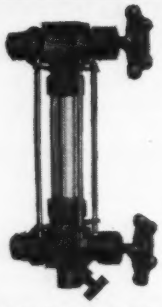

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with a final open flow of 4,500,000 cu. ft. gas with the surface elevation 748 ft., Corniferous lime 4,742 ft., Oriskany 4,845-75 ft., gas 4,848-63 ft., shot 4,845-75 ft., rock pressure 1,090 psi. 16 hours, total depth 4,875 ft. In this district, Godfrey L. Cabot, Inc., topped the Oriskany sand at 5,168 ft. in 1,223 J. L. McLean Heirs, and 9 ft. in the sand, there has been only a smell of gas.

In Laurel Hill district, Lincoln County, United Fuel Gas Co. completed 5,824 Huntington Development & Gas Co. through the Brown shale with a final gage of 808,000 cu. ft of gas, total depth 3,847 ft.

New locations in this state totaled 20 and in Glenville district Gilmer County; Harts Creek, Jefferson and Laurel Hill districts, Lincoln County; Grant and Union districts, Marion County; Liberty district, Marshall County; Harvey district, Mingo County; Summerville district, Nicholas County; Clear Fork, Marsh Fork, and Slab Fork districts, Raleigh County; Clay and Grant districts, Ritchie County; Baileysville and Center districts, Wyoming County.

On Chestnut Ridge in Georges Township, Fayette County southwest Pennsylvania, Manufacturers Light & Heat Co., drilling the Onondaga chert section of 1 Jesse S. Eutsey, their north offset to the large gas well on the Smith farm, struck their first gas at 6,904 ft. or at 4,614 ft. with additional gas at 4,620 ft. and at 4,636 ft. or 54 ft. in the chert, a volume of 650,000 cu. ft. blew the tools up the hole with the line whipped off. The tools were driven to bottom for the fishing job. Here, Peoples Natural Gas Co. topped the Oriskany sand at 7,645 ft., 5,191 ft., in 2 Walters with no commercial gas struck to date.

In Summit Township, Erie County, the northwest section of the state, Sylvania Gas Corp. test on Frank Buczhowsky was day with salt water intruding at 2,255 ft., or 3 ft. in the Oriskany sand. There was a showing of gas at the top of the sand. The Tully lime was logged at 1,768 ft., Onondaga 2,000 ft.

New locations totaled six and in Kittanning, North Buffalo, Plum Creek, and Valley townships, Armstrong County; Clarion Township, Clarion County; Conemaugh Township, Indiana County.

SOUTH LOUISIANA

Big Island Field Gets Tuscaloosa Sand Extension

NEW ORLEANS.—Union Producing Co. and M. H. Marr 1 A. N. Floyd, ½-mile north extension to Tuscaloosa sand production in the Big Island field, Rapides Parish is being completed. Total depth is 9,876 ft., with 7-in. pipe cemented to 9,784 ft. Perforations were made at 9,654-80 ft. for completion. Tanks and separators are being set up. This well is in 11-4n-2e, and is due north of the 1 Belgard discovery.

Superior Oil Co. 1 J. J. Credeur et al, wildcat 1¾ miles south of production in the Cankton field and 2 miles northeast of Boscoe field, St. Landry Parish, attempted to blow out while drilling at 10,954 ft., but was controlled and after conditioning mud, hole is being drilled ahead on a 12,000-ft. project. This well is located in Section 30-8s-4e.

Gulf Refining Co. has set 5½-in. production pipe in its 1-A A. M. Cotton et al, wildcat exploration 2 miles southeast of Bayou Boullion production in Iberville Parish, 49-9s-2w. Total depth is 11,876 ft. and 5½-in. pipe is cemented at 10,522 ft. Operators now are installing blowout preventer.

Stanolind Oil & Gas Co. has set 7-in. protection strings in two of their deep wildcat tests. No. 1 Houssiere-Latreille, 1½ miles northwest of production in the South Jennings field, Jefferson Davis Parish, total depth at 10,233 ft., set 7-in. pipe to the bottom. And in the East Florence area of Vermilion Parish, 23-13s-1w, 1 E. M. Watkins is at a total depth of 10,901 ft. with 7-in. set 1 ft. off the bottom. This is in a sidetracked hole. Original hole was dug to a total depth of 11,115 ft. where it hit a strong gas and salt water flow and stuck the drill pipe after blowing out of control.

There were 17 new locations reported this week with only one wildcat start in Assumption Parish. The 13 completions included 7 oil and 6 dry holes of which 2 were dry wildcats, 1 each in Acadia and Iberville parishes. The West White Lake and Pecan Island fields in Vermilion Parish each received 2 completions while Acadia, Iberia, Iberville, Jefferson Davis, Lafourche, St. Charles, St. Landry, St. Mary and Terrebonne parishes received only one each.

SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Sun Oil Co. 1 Haas Estate, Nowata area, 23-7s-1w, 1½ mi. SE of Ritchie field prodn., dry, TD 9,858 ft.

Iberville Parish: Humble 1 Iberville Parish School Board, 16-11s-12e, 3 mi. SW of Whitecastle field, dry, TD 12,332 ft.

MICHIGAN

Permits for Oil and Gas Tests Reach All-Time High

SAGINAW.—Biggest week's list of permits in the State Conservation Department's history was announced this week with issuance of 47 approvals for operations in 10 counties. Bulk of the new locations is for natural-gas development with 15 listed in Newaygo County, 9 in Clare, and 6 in

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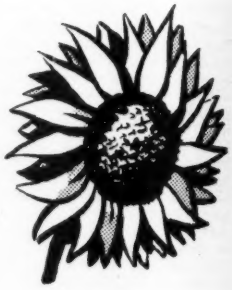

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GENERAL OFFICES: TULSA, OKLAHOMA

Mecosta County. Six of the oil-drilling locations are in Allegan County, one each in Arenac and Ogemaw, and other locations including three in Otsego, two in Bay, two in Ottawa, two in Oceana.

Field activities for the week included 24 completions, with 10 wildcat finishes, one of which was a deep gas producer in Marion Township, Livingston County. The chief development producers were the Sun Oil Co. 1 Anderson, Section 14 of Garfield Township, Newaygo County, which clocked 160 bbl. of oil in the first hour, the Fisher-McCall 1 Hedges, Monterey Township, Allegan County, which flowed 100 bbl. of oil per day pinched, and the Carter Oil Co. 1 Schiller, Claybanks Township, Oceana County, which flowed 137 bbl. of oil per day pinched.

MICHIGAN SUCCESSFUL WILDCATS

Allegan County, Cheshire Township: Ford Henry 1 M. H. Wilkinson Estate, SW NW SE 27-1n-14w, pumped 50 bbl., natural, and salt water, from Traverse limestone, TD 1,291 ft.

Livingston County, Marion Township: Panhandle Eastern Pipeline Co. 1 Carrie Francis, NE SW SE 1-2n-4e, gas well, 4,000,000 cu. ft., from Bay formation, TD 3,829 ft.

MICHIGAN WILDCAT FAILURE

Allegan County, Clyde Township: J. W. Lang Co. 1 Tefil Drozd, SW SW NE 31-2n-15w, dry in Traverse limestone, TD 1,221 ft.

Hopkins Township: W. Spencer Cook 1 A. B. Calkins, NW NE SW 29-3n-12w, dry in Traverse lime, TD 1,646 ft.

Isabella County, Sherman Township: Scott Drilling, Inc., and H. E. Bell 1 C. K. Eddy & Sons, NW NW SE 3-15n-6w, dry, TD 1,765 ft.

Kalamazoo County, Alamo Township: Harris Oil Co. and Del Fortney 1 J. Magierka, SE NE SW 31-1s-12w, dry in Traverse lime, TD 1,283 ft.

Kent County, Tyrone Township: Byron MacCallum 1 Martin Landheer, SE NE NE 27-10n-12w, dry in Traverse, TD 2,362 ft.

Algoma Township: James J. McGerry, Tr., 1 Frank E. VanderHyde, SE SW SW 14-9n-11w, dry in Traverse lime, TD 2,331 ft.

Lake County, Pinora Township: Glavin Oil Co. 1 Bates estate, NW SE SE 2-18n-11w, dry in Detroit River, TD 3,804 ft.

Missaukee County, Clam Union Township: T. R. Russell 1 State-Clam Union, SW NW SW 1-21n-6w, dry in Dundee, TD 3,856 ft.

Van Buren County, Pine Grove Township: Oil Producers, Inc., 1 E. & E. Blanchard, SW SE SW 1-1s-13w, dry in Traverse lime, TD 1,348 ft.

SOUTHWEST TEXAS

Magnolia Gives Seeligson Field New Deeper Pay Zone

CORPUS CHRISTI.—A new, deeper pay zone in the South Haldeman discovery area, Jim Wells County, 1 mile west of Seeligson field, has been opened by Magnolia Petroleum Co. 7 Seeligson Unit 4, Section 62, R. P. Haldeman Subdivision, located 1,320 ft. north of the company's 1 Clarke discovery well. Drilled to a total depth of 6,001 ft. with 5½-in. casing on bottom, this well gaged at the rate of 52 bbl. of oil per day through a ⅛-in. choke with gas-oil ratio of 540, tubing pressure 275 lb. Production is through perforations at 5,563-71 ft., approximately 1,000 ft. deeper than the discovery pay in this area.

Dirks Brothers and Tide Water Associated Oil Co. 1-B Page, new Wilcox zone discovery just northwest of the old Dirks field of Bee County, has gaged potential flow of 138.8 bbl. of 36.8°-gravity oil per day through a 9/64-in. choke. Production is through perforations at 7,426-35 ft. in the Mackhank sand. Gas-oil ratio 1,218. Tubing pressure was 800 lb., casing sealed, and there was no water in the flow. This well is located in the J. W. McFarland Survey, approximately ½ mile northwest of the old Dirks (Pettus sand) field.

The Texas Co. is reported to be preparing to run 4-in. liner to bottom at total depth of 16,006 ft., and attempt completion in a sand just above the 16,000-ft. level in its 6 Yturria Land & Livestock Co. well in Willacy County, about 8 miles northeast of Raymondville. This is the deepest depth drilled in South Texas. The well tried to blow out at the 16,006-ft. depth, and mud was badly cut with gas, but was controlled and electric log was run. Operators now are underreaming the 5-in. liner.

There were 28 new locations reported this week of which 7 were wildcats, 2 in Duval and 1 each in Jim Hogg, Nueces, San Patricio, Starr and Willacy counties. Completions were 15 oil, 1 gas and 11 dry which included 1 gas discovery in Webb County and 8 dry wildcats, 1 each in Atascosa, Bastrop, Hidalgo, Jim Hogg, Milam, Nueces, Starr and Williamson counties.

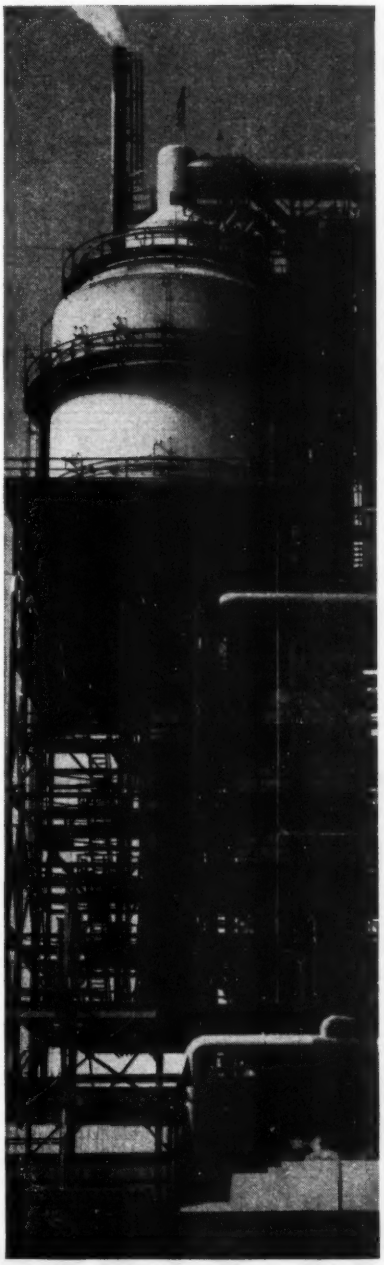
SOUTHWEST TEXAS SUCCESSFUL WILDCAT

Webb County: New gas pool—Hickok & Reynolds 1 Amado Perez et al, J. Poitevent Sur. 459, 10 mi. NE of Bruni, top pay 1,265 ft., TD 2,631 ft., perf. 1,266-76 ft., IP: 1,600,000 cu. ft. gas per day through ⅜-in. choke, SIP 498 lb., no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Atascosa County: H. R. Smith et al 1-A W. T. Hurt, in Kindallis Bryan Sur. 143, 4 mi. W of Fashing, dry, TD 3,850 ft.

Bastrop County: General Crude Oil Co. 1 Earl Callahan, in L. Leverence and Charles S. Smith Sur., 6½ mi. SW of



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Bastrop and 5 mi. E of Cedar Creek, dry, TD 3,418 ft.

Hidalgo County: Texas Co. 1 A. E. Guerra et al, in Santa Anita (Manuel Gomez) Grant, 6½ mi. SW of Linn and 12 mi. SE of La Reforma, dry, TD 9,000 ft.

Jim Hogg County: Cecil Hagen and Mills Bennett 2 M. Garza Est., Blk. 2, Sur. 39, in Alworth field area, dry, TD 2,081 ft.

Milam County: C. E. Whitehead 2 Richard Ellison, in Levi Taylor Sur., 1½ mi. W of Baileyville in north corner of county, dry, TD 3,262 ft.

Nueces County: Skelly Oil Co. 1 W. C. Rivers, in Benton Pasture Subd., 1½ mi. SE of Agua Dulce and 1½ mi. W of Agua Dulce field, dry, TD 7,358 ft.

Starr County: Daubert & Achning 1 John J. Cox, in Sur. 547, approximately ¾ mi. SE of North Rincon field production, dry, TD 6,006 ft.

Williamson County: R. Clark 1 C. Kootz, in Francis Bradley Sur., 2 mi. NE of Thrall, dry, TD 922 ft.

PERMIAN BASIN

Fullerton Field Gets Fifth Producing Horizon

MIDLAND.—Production from the Wolfcamp, of the lower Permian, became the fifth producing zone last week in the Fullerton field of northwest Andrews County. Fullerton Oil Co. 124 H. M. Wilson, Section 15, Block A-32, Public School Land, completed in the Wolfcamp for a pumping potential of 156.29 bbl. of oil a day, plus 68 bbl. of water. It was drilled to 9,235 ft., total depth, in limestone, without finding the Ellenburger, then plugged back to 8,135 ft. Perforations were at 8,098-8,135 ft., followed by 10,000 gal. of acid in stages.

Texas Pacific Coal & Oil Co. 14-E Jackson, Section 17, Block A-32, ½ mile north of Ellenburger production at Fullerton, was looking for the Ellenburger. It cored Joines limestone with shale streaks at 10,335-346 ft., which showed some oil stains but no porosity. The well was checking 400 ft. lower than the same company's 13-E Jackson, ½ mile to the south, which had top of the Ellenburger at 9,850 ft.

Completion last week was reported for Gulf Oil Corp. 421-D (originally 421-E), C. A. Goldsmith, as the Devonian discovery in the Goldsmith, San Andres, field of northwestern Ector County. Flowing potential was 127.8 bbl. of 38.5°-gravity oil, plus 163 bbl. of water. Gas-oil ratio was 676:1. Flow was through ½-in. tubing choke, from casing perforations at 7,980-90 ft. This test was the first in the area to test the Ellenburger, which was dry at 9,730 ft.

Phillips Petroleum Co.'s Ellenburger wildcat, the 1-M TXL, located between the Goldsmith and TXL fields, in Section 2, Block 15, Public School Lands, was drilling below 10,300 ft. in limestone and shale. No shows were reported.

In southwestern Ector County, Humble Oil & Refining Co. 1 Yarbrough & Allen, Section 18, Block 14, Public School Lands, was drilling ahead in lower Permian limestone after recovering only 60 ft. of drilling mud on a 1-hour drill-stem test at 7,510-7,612 ft.

In Crane County, Sinclair Prairie Oil C. 1-D University, an outpost to the Block 31 field, in NW SW Section 35, Block 31, University Lands, was drilling ahead after recovering 200 ft. of oil and gas-cut drilling mud on a 2-hour drill-stem test at 8,659-8,785 ft.

In Schleicher County, F. A. Callery 1 Sam E. Jones, in the south-central part of the county, 8 miles southeast of the Page field, was 24 ft. in the Ellenburger, topped at 5,350 ft., but no shows had been found. Drilling samples were said to have shown fractures, but no evidence of oil. Operators planned a drill-stem test.

In southern Terry County, ½ mile north of the Gaines County line and 8¼ miles north of nearest production at Cedar Lake, Amerada Petroleum Co. 1 Sam Adair, San Andres discovery, reported a recovery of 245 bbl. of oil in 24 hours of swabbing. This amount was cut by only 4 per cent basic sediment and water. Operators were testing from perforations at 4,850-4,925 ft., after washing with 500 gal. of mud acid. All the load-oil had been recovered previously, when 118 bbl. of oil was swabbed in 7 hours. Operators were to reacidize with 3,000 gal. of acid and make completion tests as a pumper.

WEST TEXAS WILDCAT FAILURES

Andrews County: Sunran Oil Corp. 1 Lockhart & Brown, Sec. 22, Blk. A-41, PSL Sur., 2 mi. W Fuhrman field, dry, TD 9,648 ft., Yates 2,800 ft., San Andrews 4,370 ft., Glorietta 5,540 ft., Tubb 6,480 ft., Woodford shale 9,305 ft., Devonian 9,592 ft., elev. 3,278 ft.

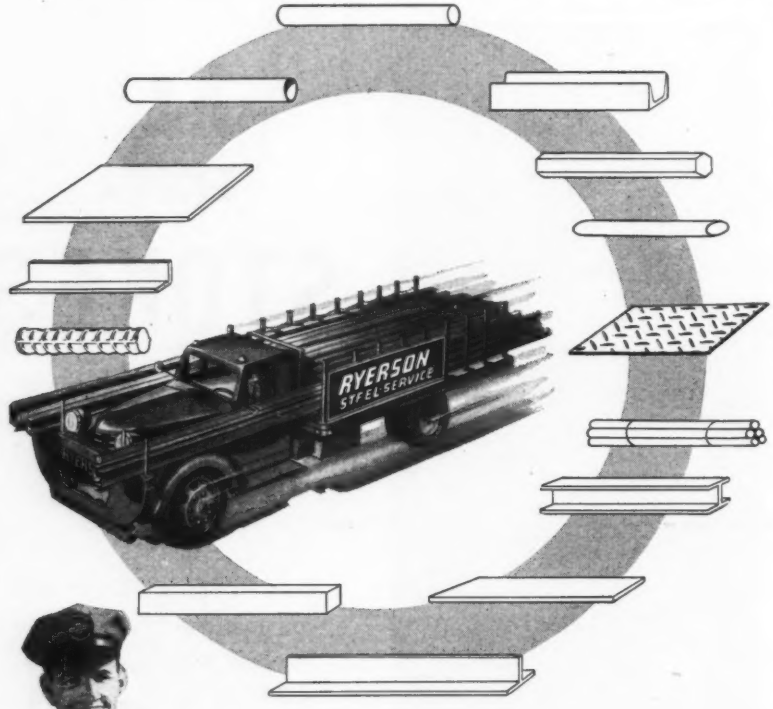
Concho County: Hedrick Oil Co. 1 J. Garner, Sec. 3, Blk. 70, H&TC Sur., 9½ mi. SE Miller View, dry, TD 2,237 ft., Strawn 1,665 ft., Ellenburger 2,193 ft., elev. 1,677 ft.

Midland County: Humble Oil & Refining Co. 1 Hugh Dixon, Sec. 9, Blk. 37, T&P Sur., 15 mi. SE Midland, dry, TD 6,150 ft. in shale, at 5,128 ft. swabbed 4 bbl. gas and oil-cut mud per hour for 6 hours, elev. 2,601 ft.

Winkler County: Mid-Continent Pet. Corp. 1-N. TXL, Sec. 21, Blk. 46, T&P Sur., 4 mi. NW TXL field, dry, TD 8,605 ft., Yates 2,850 ft., San Andres 4,330 ft., Glorietta 5,350 ft., Clear Fork 5,750 ft., Wolfcamp 7,615 ft., Devonian 8,065 ft., Silurian 8,580 ft., elev. 3,355 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—In northeastern Lea County, The Texas Co. 1-AK State, SE SE 16-16s-



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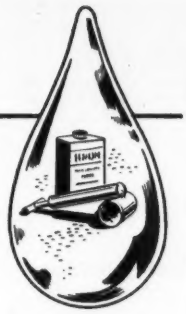

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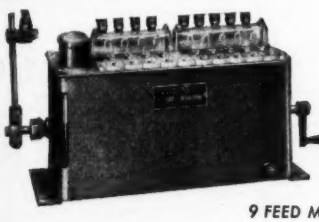

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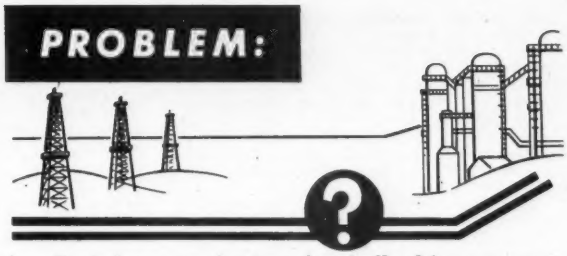

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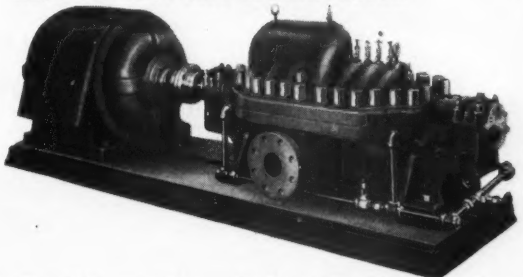

The Fig. 3360 pump has an horizontally split casing, bronze impellers, hardened steel wearing rings and stuffing box shaft sleeves, with metallic packing. Ruggedly constructed to perform economically and efficiently 24 hours a day, Fig. 3360 is built in 4, 6, and 8 stages—in 3″, 4″ and 6″ sizes.

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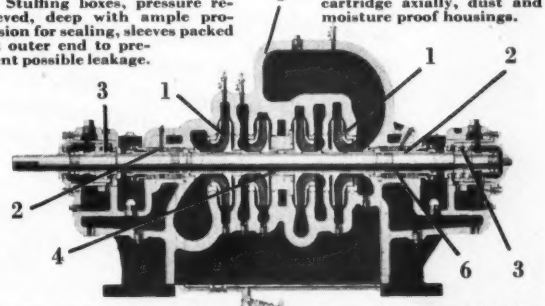
2. Stuffing boxes, pressure relieved, deep with ample provision for sealing, sleeves packed at outer end to prevent possible leakage.

3. Bearings—ring oiled, extra heavy thrust bearing, radial bearing free to slide in cartridge axially, dust and moisture proof housings.



4. Long casing bushing of non-seizing bronze with close clearances prevents excessive leakage from high to low pressure side. 6 and 8 stage have labyrinth type liner.

5. Casing is Hypress cast iron, 35-40,000 lbs. tensile.

6. For special services stuffing box sleeve can be omitted and shaft hardened, or stuffing box equipped with mechanical seal.

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SENECA FALLS, N. Y.

the PUMP FOR *the* JOB

38e, 1 mile northwest of its 1 Garrett recent San Andres discovery at 5,680 ft., was waiting on cement after setting casing at 5,640 ft. After shut in for 1 week, i was said to have made 45 bbl. of oil and 16 bbl. of water in 19 hours. Another report, however, said that with 2-in. tubing run to 5,677 ft., packer at 5,620 ft., it wa: swabbed dry, but continued swabbing, averaging 1 bbl. of salt water an hour, with a small show of oil.

In Eddy County, Grayburg Oil Co. 13-B Keeley, 26-17s-29e, on the southwest flank of the Grayburg-Jackson field, took a drill-stem test at 4,208-4,380 ft. It blew air for 2½ hours, then flowed 30 bbl. of salt water, slightly cut with oil and gas Total recovery was 420 bbl. of oil and gas-cut salt water. A swabbing test, after acid treatment at 3,420-3,533 ft., recovered 23 bbl. of water and 11 bbl. of oil; then a second treatment and it swabbed 83 bbl of water and 23 bbl. of oil. Operators were preparing to move off rotary rig and it was not known if further tests would be made.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Lea County: J. W. Sorrells 1 Sorrells, 27-22s-34e, dry, TD 4,202 ft., anhydrite 1,700 ft., salt 2,095 ft., Yates 3,837 ft., elev. 3,413 ft.

CALIFORNIA

Paloma Field Gets Small Oil Extension

LOS ANGELES.—General Petroleum Corp. apparently has added 40 to 50 acres to the productive area of the Paloma field with its 18-36 Tupman, 36-31s-26e, located in the northeast corner of the field. On a formation test at 11,920-12,205 ft. during the past week, the well flowed at the rate of 631 bbl. of 28.9°-gravity oil per day through a 24/64-in. choke. The crude was accompanied by an estimated 562,000 cu. ft. of gas. Operators are presently coring ahead below 12,100 ft. in an effort to add substantially to the 105-ft. body of saturated sand already logged.

General Petroleum started the 18-36 Tupman nearly a year ago with some misgivings since the location is far out on the flank of the structure and extremely downdip. Misfortune has dogged the crew since the beginning, the first major trouble being encountered at a depth of 10,000 ft. when the drill pipe became stuck. After several weeks of fishing, the crew backed up to 5,000 ft., cut a window in the casing and sidetracked out for a new start. The new hole was then drilled to 12,025 ft. before making a formation test. To date nearly 17,000 ft. of earth has been penetrated. Successful completion of the well, however, will give General Petroleum nearly 50 acres in Paloma unit participation.

The Texas Co. last week completed its 46-29 Westpet Unit 1, 29-30s-22e, confirmation test of its recent discovery a short distance south of the McKittrick field, the 1 Westpet. The new well flowed at the rate of 400 bbl. of 32°-gravity oil daily through a 15/64-in. choke. Water cut was 3.2 per cent, and flow was accompanied by 2,000,000 cu. ft. of gas. Production is through perforations at 4,720-48 ft. opposite the Oceanic oil sand. Top of the Oceanic was placed at 4,720 ft., with the Phacoides being logged at 4,553 ft., the Salt Creek shale at 4,570 ft. and the Kreyenhagen at 4,747 ft. Elevation of the well is 1,413 ft.

Calumet Gold Mines Co. has run and cemented casing at 1,795 ft. in its first venture to test the tar sand in the old Town Lot area of the Huntington Beach field. Top of the main Tar Zone was logged at 1,792 ft. and it is reported that a production test will be made of a 46-ft. sand interval between the top of the zone and 1,837 ft.

This sand interval has long been known at Huntington Beach, but a running sand condition heretofore has prevented successful production from the zone. The oil in the horizon is of very low gravity, estimated to average between 13° and 14°. Geologists who are familiar with the field express little doubt that the horizon can be produced if the sand can be controlled.

With its Bacon Hills discovery well practically completed, the Seaboard Oil Co. has staked location for a new wildcat venture on the Lillis Ranch in the Panoche Creek area of Fresno County. The new test will be known as the 84-36 Lillis, and it will be located in 36-15s-12e. It is situated in the northeast quarter of the section and will be drilled to the Cretaceous formation in which the Jergens Oil Co. found indications of production several years ago. The Seaboard venture, however, is located on a separate structure which is rather small in areal extent. Western Gulf Oil Co. drilled a test near this structure some years ago, but failed to find anything of interest.

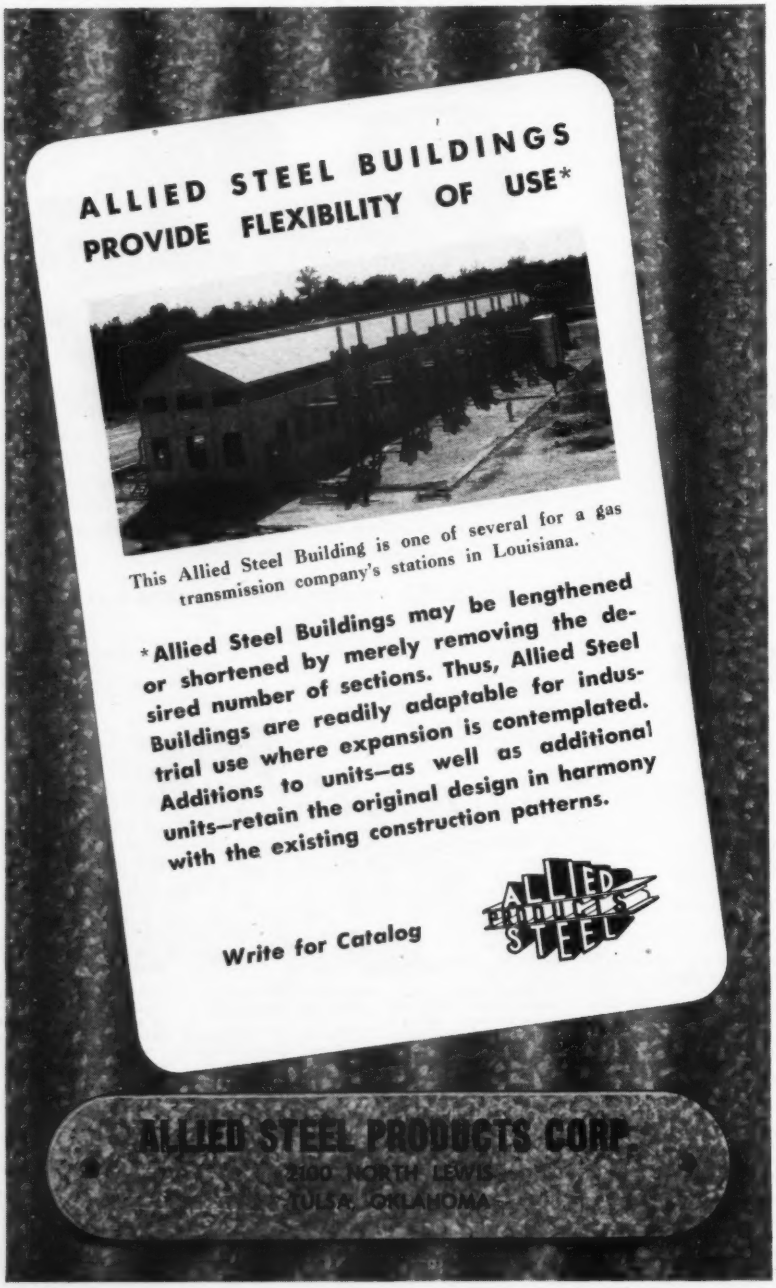
Pike Drilling Co. has completed derrick preparatory to a redrill operation at the Macco Corp. et al 2 Coffin fee, 28-2s-14w, within the city of Inglewood and near the northwest tip of the Potrero field. The well is now bottomed at 6,508 ft. and will be sidetracked from a depth of 1,000 ft. It is located ¾ mile southeast of Basin Oil Co. 1 Standard Brick, a recent extension well to the field. The 2 Coffin fee will seek the same zone uncovered by Basin around 9,000 to 10,000 ft.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, McKittrick Area: The Texas Co. 46-29 West Pet. Unit One, 29-30s-22e, flowed 400 bbl. day through 15/64-in. choke, 32.0° gravity, 3.2 per cent cut, perf. 4,720-48 ft., Oceanic oil sand 4,720 ft., TD 4,773 ft.

Solano County, Kirby Hills Area: Shell Oil Co., Inc., 2 Wagenet, 19-4n-1e, 10,650,000 cu. ft. gas through ½-in. choke, perf. 5,395-5,460 ft., TD 6,000 ft.

Winters Area: Shell Oil Co., Inc., 4-1 Win-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CALIFORNIA WILDCAT FAILURES

Kern County, Arvin Area: Honolulu Oil Corp. 1 Honolulu et al, 15-31s-29e, dry, elev. 450 ft., Santa Margarita 6,865 ft., Cattani sand 6,743 ft., Schist 7,807 ft., TD 7,810 ft.

Pleito Area: Independent Exploration Co. et al 11-10 KCL-A, 10-10n-20w, dry, elev. 1,731 ft., TD 5,538 ft.

Round Mountain Area: Independent Exploration Co. 2 Olcese, 16-28s-29e, dry, elev. 1,155 ft., Gray Vedder 1,956 ft., TD 1,963 ft.

N. CENTRAL TEXAS

Montague County Test Dry in Bend Conglomerate

WICHITA FALLS.—Continental Oil Co.'s Montague County wildcat, the 1 Paul Magee, C. A. Wright Survey, 3 miles southeast of Montague, was a conglomerate failure and operators planned to plug back to test shows of oil logged in the Strawn at 6,018-48 ft. Perforations in the Bend conglomerate at 6,294-6,302 ft. resulted in swabbing 61 bbl. of salt water, no oil, and only a slight show of gas, in 18 hours.

Fred Manning 1 Marshall, 4 miles northwest of Woodson in Trockmorton County, was completed as a southwest extension to Manning-Parrott field. Completion potential was 467 bbl. of oil a day through 14/64-in. choke, from the Caddo at 3,948-53 ft.

Flush Ellenburger production was found in the Fargo area of Wilbarger County at Humble Oil & Refining Co. 6 Virginia McCaleb, Section 34, Block 15, H&TC Survey. On an elevation of 1,388 ft. it topped the Ellenburger at 6,248 ft. A drill-stem test at 6,250-6,345 ft., total depth, brought gas to the surface in 11 minutes, oil at the end of 23 minutes. The amount of oil recovered was not reported, but it was said to have filled the entire length of drill pipe. Regular pay for the field is from the Pennsylvanian. One-half mile to the south, Amerada Petroleum Corp. 1 Goodpasture was said to have shown for about 100 bbl. of oil a day from the Ellenburger, but was completed in the regular pay. Humble's well is said to be checking some 36 ft. higher than the Amerada well.

In Montague County, Youngblood & Foree 3 Benton, Lewis Survey, indicated second producer in Caudle field northwest of Stoneburg, was drilling ahead while waiting on casing. A 65-minute drill-stem test in the Bend conglomerate at 6,127-34 ft. produced oil in 61 minutes, recovering 435 ft. of oil and 400 ft. of salty mud. A second test at 6,209-34 ft. showed only mud.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: W. G. Gouchie 1 C. L. Abercrombie, C&P Subd., 6 mi. E Archer City, dry, TD 1,225 ft., dry sand 1,177 ft.

W. J. Grisham 1 R. Campbell, Sec. 1,812, J. Tomlinson Sur., 5½ mi. NE Olney, dry, TD 1,160 ft., Gunsight 1,060 ft.

Cooke County: Shell Oil Co., Inc., et al 1 J. M. Pearce, S. C. Adkinson Sur. A-10, 6 mi. SE Gainesville, dry, TD 4,209 ft., show dead oil 2,148 ft., 3,962 ft., Arbuckle 4,124 ft., Ellenburger 4,140 ft.

Cottle County: Anderson-Prichard Oil Corp. 1 Bettie L. Wooley, Bettie L. Wooley Sur., 14 mi. SW Paducah, dry, TD 5,41[illegible] ft., limestone with slight show gas at 3,571-81 ft., chert 5,310 ft., Ramsey sand 5,380 ft., elev. 2,024 ft.

Hardeman County: E. C. Norwood Drilling Co. 1 O. H. Dodson, Sec. 49, H&TC Sur., 3 mi. N Chillicothe, dry, TD 5,400 ft., no tops reported.

Montague County: H. D. Egger 1 J. R

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Womack, E. A. Walker Sur., 2½ mi S Spanish Fort, dry, TD 2,005 ft. i shale.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: James L. White 1 W. T Martin, A. Arrocha Sur. 205, 3 mi. N Brooksmith, dry, TD 1,790 ft., Ellenburger 1,610 ft.

Jones County: Louis Green et al 1 R. P King, Sec. 42, Orphan Asylum Lands 3 mi. NW Nugent, dry, TD 1,980 ft. in shale.

Stonewall County: Pan American Production Co. 1 T. A. Jean, Sec. 166, B H&TC Sur., 6½ mi. SW Aspermont, dry, TD 6,341 ft., Dotham 2,923 ft Saddle Creek 3,248 ft., Coal 3,250 ft., Palo Pinto 5,267 ft., Strawn 5,550 ft. Caddo 5,938 ft., Mississippi 6,030 ft Ellenburger 6,220 ft., slight show ga 4,820-70 ft., elev. 1,761 ft.

Taylor County: The Texas Co. 1 Mark Malone, J. M. Page Sur. 123, 3 mi. SE Merkel, dry, TD 3,010 ft., Flippen 2,484 ft., sand with show oil 2,532 ft.

LA.-ARK.

Wildcat Test in Hempstead Co. Has Slight Gas Show

SHREVEPORT.—C. L. Wickcliffe 1 Ward, wildcat test 9 miles northwest of Prescott, Hempstead County, last week perforated liner at 1,760-70 ft., but did not test that section. New perforations were made at 1,158-68 ft., and bailed out with no recovery. Additional shots at 1,015-25 ft. gave no results. Operators then perforated at 719-729 ft. and fluid, fresh water with a slight show of gas, rose to the top in 10 minutes. Plug was set at 800 ft. to squeeze off the holes.

In Columbia County, Placid Oil Co. 1 Farmers Bank & Trust Co., 1-17s-20w, a scheduled 7,000-ft. Smackover test, was drilling below 7,273 ft., with no shows reported. In Lafayette County, 1½ miles north of McKamie field, McAlester Fuel Co. 1-A Texas Co.-Lee, had no shows reported to 6,996 ft. Sample tops were: Base Massive anhydrite 3,530 ft., lower anhydrite stringer 4,600-10 ft., James limestone 5,070-80 ft., Travis Peak 5,490-5,500 ft.

Louisiana exploration tests included Skelly Oil Co. 1 Nash, 20-12n-16w, which was drilling ahead below 7,390 ft. in sand and shale of the Travis Peak. Drillers' top on that formation was 6,294 ft. In Red River Parish, 2-13n-10w, British American Oil Producing Co. 1 Wimberly was drilling below 6,610 ft. on last report. Stanolind Oil & Gas Co.'s deep test, 1 Tremont Lumber C., 30-12n-1w, Winn Parish, was reported drilling below 10,700 ft.

NORTH LOUISIANA WILDCAT FAILURE

Franklin Parish: Big Chief Drilling 1 D Slack, 1-15n-7e, dry, TD 3,924 ft., chalk 2,987 ft., Gas rock 2,989 ft., Tuscaloosa 3,054 ft., Lower Cretaceous 3,762 ft.

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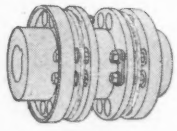

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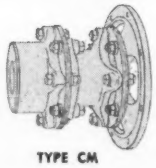

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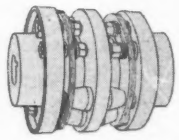

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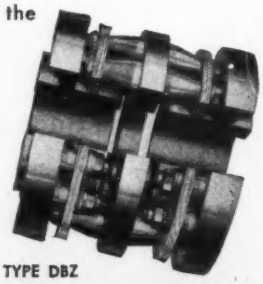

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OKLAHOMA

East Lindsay Pool Extended By Good Bromide Producer

MAX PRAY and R. L. Bauman 1 Hinkle, NW SW 6-4n-3w, Garvin County, flowed 206 bbl. in 24 hours from perforations in the Bromide at 9,860-10,055 ft. This well is ½ mile southeast of the East Lindsay pool opener, Pray and Bauman 1 Martin, NE NE 1-4n-4w, which produces from Hunton lime.

Deering, Inc., and O. L. Ledgerwood 1 Howard, NW NW 15-5n-2w, McClain County, appears to be giving the Southwest Wayne pool a 1-mile northwest extension. The well flowed 38 bbl. oil in 30 minutes through perforations at 7,140-45 ft., opposite Bois d'Arc section of the Hunton, and was then shut in for tanks. Total depth is 7,200 ft. Pipe was set at 7,150 ft.

Elmore City pool in 14-2s-2w, Garvin County, has 10 wells drilling in Section 14, within a radius of less than ½ mile from the discovery well, the Anderson and Prichard 1 Seaton, SE SE NW 14-2s-2w. Mid-Continent Petroleum Corp. is running pipe in 1 Vandiver, SE SW SW Section 14, which promises to be the second producer in the new pool. A drill-stem test in the Gibson sand at 6,519-29 ft. flowed gas in 2 minutes, estimated at 500,000 cu. ft. per day and flowed oil in 10 minutes.

Big Chief Drilling Co. 1 Marshall, NW SE SE 14-5n-2w, McClain County, flowed 10 bbl. oil per hour through ½-in. choke after acidizing Hunton lime at 5,920 ft. This well is located about midway between the main part of Southwest Wayne pool and the Wood Oil Co. 1 Henderson, northwest outpost producer in SE NE NW section 14, and is about ¾ mile from nearest production in 3 different directions.

Stanolind Oil and Gas 1 Briscoe, NW SE 4-4n-5w, Grady County, recovered 30 ft. of free oil on drill-stem test at 10,012-60 ft. and is drilling below 11,170 ft. Core at 9,553-55 ft. showed 1½ in. of highly saturated sand. This test is located 9 miles due west of the East Lindsay pool development and about 6½ miles east of the Chitwood pool.

Texas Co. 1 Denny, NE NE NE 1-2s-4w, Stephens County, swabbed 6 bbl. oil per hour, free of water, from perforations in the Pennsylvanian sand at 6,850-65 ft. The hole was drilled to 7,382 ft., plugged back to 7,170 ft. and pipe was set at 7,005 ft. This test is located about 1½ miles southwest of Scholem-Alechem pool, 1¾ miles north of the Milroy pool, and 4½ miles east of the Velma pool.

Superior Oil Co. 1 Scott, NE NW SE 27-22n-10w, Major County, ½ mile southeast of the Ringwood pool discovery well, recovered 60 ft. of 40.5°-gravity oil and 70 ft. oil-cut mud from drill-stem test at 6,729-58 ft. in basal Pennsylvanian sand.

S. M. Stauffer 1 Hall, NE NE SE 9-25n-7w, Grant County, had top of Hunton at 5,448 ft., total depth 5,529 ft. Pipe was set at 5,448 ft. and operator is waiting on cable

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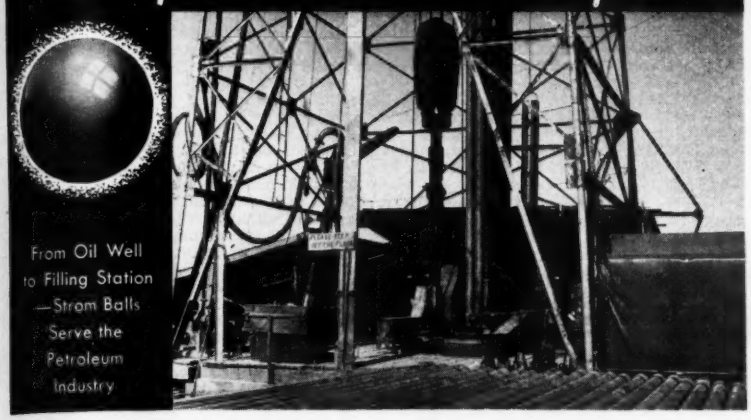

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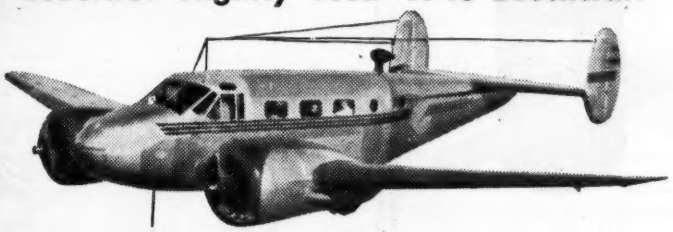

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Tulsa, Oklahoma

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tools. Drill-stem test at 5,497-5,529 ft. recovered 275 ft. muddy oil and 50 ft. water.

Texola Oil Co. 1 Tas Saw, SW NE SW 24-4n-11w, Comanche County, tested 10,705,000 cu. ft. gas per day from Bromide sand topped at 1,751 ft. Pipe was set at total depth 1,762 ft. This test is 11 miles southwest of the Cement field, and 4 miles northwest of the Fort Sill Reservation pool.

OKLAHOMA SUCCESSFUL WILDCAT

Kingfisher County: J. A. King 1 Lankard NE NE SE 34-17n-6w, pumped 4 bbl. of 39°-gravity oil per day from Hunton at 7,562-82 ft.; Oswego 6,431 ft., Mississippian 7,000 ft., Woodford 7,510 ft., Sylvan 7,820 ft., dolomite 7,882 ft., Viola 7,915 ft., dense 8,000 ft., 1st Wilcox 8,115-30 ft., 2nd Wilcox 8,275 ft., TD 8,330 ft.

Oklahoma County: Harper-Turner 1 Boles, C SW SE 20-14n-2w, extension to So. Coffee Creek District, produced 1,500,000 cu. ft. gas from Bartlesville at 5,935-60 ft., TD 5,960 ft.

OKLAHOMA WILDCAT FAILURES

Beaver County: Gulf Oil Corp. 1 Boileau, SE SE SW 27-3n-20ecm, dry, TD 2,700 ft., no tops reported.

Cotton County: Snoddy Brothers 1 Holmes, NE NE SW 13-2s-13w, dry, TD 2,001 ft., broken sand 750-900 ft., limy sand and shale 900-1,110 ft., Megargel lime 1,700-80 ft.

G. B. & V. C. Howell 1 Tollett, NW NW NE 7-3s-11w, dry, TD 2,007 ft., no tops reported.

Elmer Graham 1 Ota Too Ch Nip Pah, NW NW NW 14-4s-11w, dry, TD 2,049 ft., lime 2,000 ft.

Creek County: Tom Palmer 1 Thornton, SW SE NW 9-17n-9e, dry, TD 3,278 ft., Bartlesville 2,490-2,504 ft., Woodford 3,224 ft., dolomite 3,267 ft., Wilcox 3,274 ft.

The Texas Co. 1 Carlock-Ledbetter, SW SW SE 1-4n-3w, dry, TD 8,094 ft., Belle City 5,595 ft., Checkerboard 6,288 ft., Deese 6,318 ft., sand 6,410-65 ft. and 6,720-70 ft., Viola 6,915 ft., Trenton 7,070 ft., Bromide dense 7,410 ft., 1st sand 7,627-35 ft., 2nd sand 7,678-7,770 ft., McLish lime 7,965 ft., sand 7,975 ft.

Hughes County: Republic Natural Gas 1 Harrod, SW SW NE 7-8n-10e, dry, TD 3,523 ft., Senora lime 1,034 ft., Senora sand 1,101 ft., Bartlesville 2,030 ft., Upper Booch 2,500 ft., Lower Booch 2,575 ft., Gilcrease sand 2,925 ft., Union Valley-Cromwell 3,477 ft.

Lincoln County: Wilcox & Midco Oil Co. 1 Potter, NE SW SE 24-16n-2e, dry, TD 5,581 ft., Hogshooter 3,410 ft., Layton 3,435-3,500 ft., Oswego 4,120 ft., Verdigris 4,222 ft., Skinner 4,295 ft., Mississippian 4,620 ft., Woodford 4,738 ft., Sylvan 4,809 ft., Simpson dolomite 4,962 ft., Wilcox sand 4,984-5,002 ft., 2nd Wilcox 5,030-5,140 ft., Arbuckle 5,453 ft.

Pawnee County: Porter Oil & Gas Co. 1 Taulman, NW NE NE 15-23n-4e, dry, TD 4,190 ft., Layton 2,255-2,400 ft., Big lime 2,745-58 ft., Oswego 2,900-3,075 ft., Mississippian 3,430 ft., dolomite 3,755 ft., Wilcox 3,760 ft., Arbuckle 3,968 ft.

Seminole County: Justrite Drilling Co. 1 M. Bert Smith, NW NE NW 28-7n-6e, dry, TD 3,422 ft., brown lime 3,190 ft., Wapanucka 3,290 ft., Cromwell 3,342 ft., 2nd Cromwell 3,411 ft.

Tillman County: H. J. Heartwell 1 Fisher, NW NW SW 9-1s-14w, dry, TD 1,020 ft., sand with a stain of oil 700 ft.

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OHIO, KENTUCKY

Gas Production From Shale Formations Important

COLUMBUS. — Gas production from the Ohio shales is becoming more important as the sand fields become depleted and the larger producers of the state will make a diligent effort to search out the best areas. Research in better methods of drilling the shale and in preserving the hole, and new methods of shooting are being tried out.

The Ohio Fuel 1 W. H. Ritchie, Section 1, Chester Township, Meigs County, was drilled to 3,260 ft. and the Brown shale shot with 2,667 lb. of D. P. 118 from 2,820-3,260 ft. The gage after shot showed 168,000 cu. ft. with 730 psi. pressure, and the well will be tested in the line for a month as it is 7 miles from the Sutton production.

A good result from this same type of shot was found in the Ohio Fuel 1 John Rauch, Lot 2, Newark Township, Licking County. The Big Cinnamon at 1,130-1,412 ft. was shot, and when shut in gaged 558,000 cu. ft.

F. E. Barnhart 1 Emma Bowman, Section 10, Hanover Township, Ashland County, made 900,000 cu. ft. natural, and when shut in after shot the gage was 2,572,000 cu. ft. with a rock of 1,180 psi. Clinton sand was found at 2,882-94 ft. North and south offsets to the well will be drilled.

The St. Peter test in Salt Creek Township, Muskingum County, being drilled by the Industrial Gas on M. J. Wickam, Section 10, was dry but it will be drilled deeper before plugging. The St. Peter was logged at 6,617-20 ft. and black lime at 6,720 ft.

Perry County reported six new operations and was followed by Monroe with four, Stark three, and eight scattered. Completions totaled 30 with Brush Creek leading with 8.

OHIO WILDCAT FAILURE

Muskingum County, Salt Creek Township: Four Way Oil & Gas 1 L. A. Pletcher, Section 1, Clinton 4,393-4,443 ft., Medina 4,505-13 ft., TD 4,521 ft.

EASTERN KENTUCKY

ASHLAND.—One completion was noted in the Eastern Kentucky field of operations

during the week, and deepening operations on two Pike County properties were continuing.

Kentucky-West Virginia Gas Co. completed Well No. 839 on the W. D. Hall property, Knott County, 2,925 ft., with production of 179,000 cu. ft. gas in shale, A. S.

Deepening operations are on the Dan J. Syck land, Well No. 760, at 3,290 ft. in shale and E. L. Pinson land, Well No. 812, at 1,935 ft. in black lime. Both are Kentucky-West Virginia Gas operations.

WESTERN KENTUCKY

OWENSBORO.—Carter Oil Co. 1 Mattingly, NE NW NE 19-P-23, Henderson County, located about 2½ miles northeast of the Rock Springs pool, is drilling below 2,372 ft. Paint Creek was logged at 2,320-30 ft.

Included in this week's 16 completions are 4 oil wells and 12 dry holes. Four of the dry holes were wildcats, 2 in Henderson County, and 1 each in Webster and Warren counties.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Carter Oil Co. 1 J. M. Hatchett, 16-O-23, 6 bbl. on pump in Waltersburg 1,793-1,806 ft., TD 2,818 ft.

Carter Oil Co. 1 Edward Utley, 15-O-23, dry at 2,738 ft., elev. 445 ft., Benoist 2,390 ft., Aux Vases 2,501 ft., Ste. Genevieve 2,573 ft., McClosky 2,591 ft.

J. B. Buckman 1 Campbell-Osborn, 1-N-22, dry at 2,707 ft.

Warren County: F. Puckett & G. Landensleger 1 Roy Granger, 16-E-36, dry 900 ft., Chattanooga 673 ft., Devonian 739 ft.

INDIANA

EVANSVILLE.—H. E. Ledbetter-C. E. Brehm 1 Wiley, NE NE NE 1-6s-14w, Posey County, has pipe set at 2,116 ft. on top of saturated Palestine sand, logged at 2,116-22 ft. Drill-stem test recovered 425 ft. of clean oil and no water. Drilling was stopped in saturated sand at 2,122 ft. This test is about 3 miles from nearest production.

Earnest Zink et al 1 Halter, 7-2n-10w, Knox County, is pump-testing the Aux Vases lime logged at 1,816-21 ft. after acid treatment of 3,500 gal. Total depth is 1,885 ft.

INDIANA WILDCAT FAILURES

Gibson County: C. E. Skiles 1 Turner, NE NE SW 3-2s-12w, dry at 2,312 ft., elev. 395 ft., Glen Dean 1,871 ft., Barlow 2,051 ft., Renault 2,276 ft.

Sullivan County: J. L. Black 1 Kennett, NW NE SW 20-8n-10w, dry at 2,780 ft., TD 2,780 ft., Benoist 1,370 ft., Ste. Genevieve 1,413 ft., Salem 1,836 ft., Chattanooga 2,586 ft., Devonian 2,712 ft.

ILLINOIS

Pipe Set on Promising Oil Shows in Two Wells

MATTOON.—Fred Hildt 1 Endicott, NW SW NE 28-3s-10e, White County, logged show of oil in Benoist at 2,990-3,005 ft. and is waiting on cement with 7-in. pipe set at 2,990 ft. Total depth is 3,142 ft.

Carter Oil Co. 1 J. G. Churchwell, SE SE SW 16-3s-8e, Wayne County, has 7-in. set at 3,530 ft. to test the McClosky logged at 3,469-84 ft. A drill-stem test at 3,469-84 ft. flowed gas in 38 minutes, and recovered 150 ft. oil and 165 ft. water. Total depth is 3,556 ft. This well is located about 1½ miles east of production in Mill Shoals pool.

In Hamilton County, T. B. Dirickson 1 Amy Penny, NW NW SW 1-7s-6e, located about 2 miles southeast of Walpole pool, is drilling below 3,000 ft. W. F. Lacey 1 Woody, SW SW SW 26-6s-7e, located 5 miles west of the Iron pool, is drilling below 3,005 ft.

About 2 miles east of the Dundas Consolidated pool, Turley and Cochran are reopening an abandoned wildcat, 1 Givens, NE NE NE 10-5s-10e, White County, and are cleaning out below 2,975 ft. The test was originally drilled to 3,108 ft. and was abandoned in November 1939.

ILLINOIS WILDCAT FAILURES

Clark County: C. F. Fitzgerald 1 Montgomery, NW NW NW 10-11n-13w, dry at 712 ft., no log.

Cumberland County: Joe Reznik 1 Butler, NW SW NE 20-9n-9e, dry at 2,660 ft., elev. 515 ft., Tar Springs 2,025 ft., Barlow 2,228 ft., Benoist 2,420 ft., Fredonia 2,554 ft.

Effingham County: Inland Oil Co. 1 Hoene, NW SW SW 35-9n-6e, NW SW SW 35-9n-6e, dry at 2,465 ft., Ste. Genevieve 2,365 ft., McClosky 2,391 ft., St. Louis 2,449 ft.

Jasper County: A. J. Slagter 1 First National Bank of Newton, NE SW SW 10-5n-10e, dry at 2,946 ft., Tar Springs 2,282 ft., Golconda 2,410 ft., Ste. Genevieve 2,837 ft., McClosky 2,888 ft.

Wabash County: George H. Wickham 1 F. Smith, SE NE SW 36-1n-13w, dry at 2,632 ft., Tar Springs 1,929 ft., Barlow 2,240 ft., Benoist 2,394 ft., Renault 2,507 ft., Rosiclare 2,570 ft.

KANSAS

Two New Pools Extended By Good Producers

SKELLY 1 Rempe, NW NW NE 28-9s-18w, Rooks County, extends the Paradise pool ½ mile south. The well made 67 bbl. oil in 7 hours on a pumping test. Top of Arbuckle was logged at —1,429, which is 19

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ft. lower than in the Hartman 1 Rempe, ½ mile north which opened the pool.

Plains Exploration Co. 1 Darlington, NE SW SW 20-28s-9w, Kingman County, which is a northwest offset to the discovery well of the Pat Creek pool, appears to be a good well in the Viola lime. The well started flowing at an estimated rate of 100 bbl. oil per hour when plug was drilled out to total depth of 4,416 ft., or 9 ft. in the Viola. This will be the second producer in the recently discovered pool, opened by Plains Exploration 1 Swandra, SW SE SW Section 20, the south offset to the discovery well, Phillips Petroleum Co. 1 Darlington, SW NE NW 29 being dry in Viola which was found 11 ft. lower than in the discovery well. The Plains Exploration well logged Viola at —2,687 or 1 ft. higher than in the discovery well.

Twelve miles southwest of the Pat Creek pool, Globe Oil & Refining Co. 1 Cirkel, NW NE 30-29s-10w is drilling below 4,662 ft., after failing to find oil in Viola logged at 4,550 ft. or —2,850 ft.

The Morel pool in Graham County, opened in 1938, has a ¼-mile southwest extension with a maximum well in Barnett Drilling Co. 1 Andreson "B," NW NE NW 21-9s-21w. The same operator has completed 3 maximum wells in 16-9s-21w, which is on the west side of the old Morel pool.

Kansas-Nebraska Natural Gas Co. 1 Unruh, NW NW NW 16-20s-15w, Barton County, located 1 mile northeast of the East Pawnee Rock pool, had an estimated gas show of 2,000,000 cu. ft. gas per day at 3,765 ft. or 31 ft. in the Arbuckle lime. Operators are running pipe to test.

With the completion of the Middle States Oil Corp. 2 Cross, NW NW SE 2-11s-18w and Continental Oil Co. 2 Watkins, SE SW NW 2-11s-18w, as maximum wells, the Northwest Burnett pool in Ellis County now has 11 maximum wells out of the first 12 completions, the one exception being a minimum well which is offset on 3 sides by maximum wells.

KANSAS SUCCESSFUL WILDCATS

Rooks County: W. L. Hartman 1 Rempke, NW NW SE -21-9s-18w, produced 1,470 bbl. of 25.5°-gravity oil per day from Arbuckle at 3,576-92 ft.; anhydrite 1,495 ft., Topeka 3,076 ft., Heebner 3.286 ft., Lansing-Kansas City 3,325 ft., TD 3,592 ft.

Rush County: Darby & Bothwell 1 Weitzell, SW SW NW 1-16s-20w, produced 194 bbl. of 35°-gravity oil per day from conglomerate at 3,678-90 ft.; anhydrite 1,320 ft., Topeka 3,105 ft., Heebner 3,343 ft., Lansing-Kansas City 3,384 ft., Basal Kansas City 3,609 ft., Marmaton 3,665 ft., TD 3,690 ft.

KANSAS WILDCAT FAILURES

Barton County: Keener Oil 1 Tucker, NW NW NE 33-20s-13w, dry, TD 3,586 ft., anhydrite 759 ft., Heebner 3,152 ft., Lansing-Kansas City 3,279 ft., conglomerate 3,536 ft., Simpson 3,544 ft., Arbuckle 3,551 ft.

Butler County: Adair Oil Co. 1 Guyot, SW SE SE 5-29s-5e, dry, TD 2,882 ft., Kansas City 2,230 ft., Bartlesville 2,815 ft., Mississippian 2,865 ft.

Veeder Supply 1 Whitbeck, SW NW NW 27-29s-5e, dry, TD 2,883 ft., Lansing 1,818 ft., Kansas City 2,219 ft., Marmaton 2,539 ft., Mississippian 2,859 ft.

Ellis County: Bay Petroleum et al 1 McCombs "B," NW NW SW 11-11s-17w, dry, TD 3,400 ft., Lansing-Kansas City 3,001 ft., conglomerate 3,296 ft., Arbuckle 3,375 ft.

Brunson & Adair et al 1 Schmide, NE NE SW 22-15s-17w, dry, TD 3,585 ft., anhydrite 1,114 ft., Lansing-Kansas City 3,275 ft., Marmaton 3,525 ft., sandy conglomerate 3,543 ft., cherty conglomerate 3,581 ft.

Kingman County: E. F. Wakefield et al 1 Albritten, NE NE NE 35-28s-10w, dry, TD 4,690 ft., Lansing-Kansas City 3,700 ft., Mississippian 4,209 ft., Viola 4,502 ft., Simpson 4,571 ft., Arbuckle 4,660 ft.

Rooks County: Derby & Bothwell 1 Stamper, NW NW SW 28-8s-17w, dry, TD 3,466 ft., Topeka 2,886 ft., Lansing-Kansas City 3,143 ft., conglomerate 3,430 ft., Arbuckle 3,440 ft.

Herndon Drilling 1 Overholzer, NW NW NW 31-9s-16w, dry, TD 3,737 ft., Topeka 2,961 ft., Heebner 3,003 ft., Lansing-Kansas City 3,246 ft., conglomerate 3,563 ft., Simpson 3,651 ft., Arbuckle 3,675 ft.

Stafford County: Three Way Drilling and Texon 1 Witt, C N/2 NW SW 30-22s-12w, dry, TD 3,785 ft., anhydrite 695 ft., Topeka 2,905 ft., Lansing-Kansas City 3,362 ft., conglomerate 3,623 ft., Simpson 3,710 ft., Arbuckle 3,770 ft.

Sumner County: Falcon Seaboard 1 Stewart Estate, C NE SE 18-31s-1e, dry, TD 4,164 ft., Lansing-Kansas City 2,935 ft., Mississippian 3,585 ft., Simpson 4,020 ft., Arbuckle 4,114 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR. Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m., Wednesday, May 14, 1947, for lands described herein situated within the known geologic structure of the designated oil and gas fields (undefined), in Louisiana. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (41 Stat. 437, 30 U.S.C. sec. 181), as amended, in the following parcels: Monroe gas field, Parcel No. 1, T. 18 N., R. 4 E., sec. 24, fractional lot 3, 9.24 acres. Parcel No. 2, T. 19 N., R. 5 E., sec. 10, SE¼SE¼, 40 acres. Parcel No. 3, T. 20 N., R. 5 E., sec. 34, SE¼ SE¼, 40 acres. Parcel No. 4, T. 19 N., R. 5 E., sec. 18, SW¼SE¼, 40 acres. Bethany gas field, Parcel No. 1, T. 15 N., R. 16 W., sec. 6, fractional NE¼NE¼, 41 acres. Haynesville oil field, Parcel No. 1, T. 23 N., R. 8 W., sec. 6, fractional NW¼SW¼, 27.87 acres. Simsboro gas field, Parcel No. 1, T. 17 N., R. 4 W., sec. 9, E½NW¼, 80 acres. Lake Bistineau gas field, Parcel No. 1, T. 16 N., R. 10 W., sec. 4, lots 5, 6, 7, 8, 88.34 acres. Parcel No. 2, T. 16 N., R. 10 W., sec. 22, NW¼ SE¼, 40 acres. Red River-DeSoto oil and gas field, Parcel No. 1, T. 12 N., R. 11 W., sec. 10, W½SW¼, 80 acres. Parcel No. 2, T. 12 N., R. 12 W., sec. 10, SW¼NE¼, SE¼NW¼, 80 acres. Sarepta-Cartersville oil and gas field, Parcel No. 1, T. 22 N., R. 11 W., sec. 2, lot 2, 7.28 acres. Parcel No. 2, T. 22 N., R. 11 W., sec. 4, lot 4, 6.72 acres. Parcel No. 3, T. 22 N., R. 11 W., sec. 5, lots 3, 4, 13.68 acres. Parcel No. 4, T. 23 N., R. 11 W., sec. 31, SE¼NW¼, 40 acres. Elm Grove oil and gas field, Parcel No. 1, T. 16 N., R. 12 W., sec. 36, lots 6, 7, 8, 48.52 acres. Shreveport oil field, Parcel No. 1, T. 17 N., R. 14 W., sec. 4, lot 7, 21.38 acres. Parcel No. 2, T. 17 N., R. 14 W., sec. 4, lots 8, 9, 10.76 acres. Parcel No. 3, T. 17 N., R. 14 W., sec. 4, lot 10, 11.12 acres. Parcel No. 4, T. 17 N., R. 14 W., sec. 6, lots 4, 5, 79.45 acres. Parcel No. 5, T. 17 N., R. 14 W., sec. 6, lot 6, 21.09 acres. Parcel No. 6, T. 17 N., R. 14 W., sec. 8, lot 1, 1.24 acres. Parcel No. 7, T. 18 N., R. 14 W., sec. 14, lot 18, 3.23 acres. Parcel No. 8, T. 18 N., R. 14 W., sec. 20, lot 9, 21.00 acres. Parcel No. 9, T. 18 N., R. 14 W., sec. 30, lot 5, 28.68 acres. Parcel No. 10, T. 18 N., R. 14 W., sec. 32, E½NE¼, 80 acres. Parcel No. 11, T. 17 N., R. 15 W., sec. 12, lot 1, 24.38 acres. Parcel No. 12, T. 18 N., R. 15 W., sec. 24, lot 7, 5.67 acres. Parcel No. 13, T. 18 N., R. 15 W., sec. 24, lots 8, 9, 10, 11, 12, 105.81 acres. Parcel No. 14, T. 18 N., R. 15 W., sec. 36, lots 1, 2, 3, 3.89 acres. Pine Island oil field, Parcel No. 1, T. 21 N., R. 15 W., sec. 10, E½NE¼, 80 acres. Rodessa oil field, Parcel No. 1, T. 23 N., R. 16 W., sec. 2, fractional SW¼NE¼, 27.96 acres. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil and 12½ per cent to 16 2/3 per cent for gas, in accordance with Schedule B in the lease form. Bids must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., and each bidder must submit with the bid one fifth of the amount bid in cash or by certified check on a solvent bank, or by money order, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42(b) and (c). The envelopes should be plainly marked "Bid for Parcel No. . ., (name field). Not to be opened before 1 p.m., May 14, 1947." No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid, and a corporate surety bond in the sum of at least double the amount of rental but in no case less than $1,000 nor more than $5,000 must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Director.

Ten Papers to Be Heard In Ordovician Symposium

Ten papers on the Trenton and sub-Trenton rocks of the Appalachian Basin will be presented May 16 at the Ordovician symposium, to be held under the auspices of the Pittsburgh Geological Society in the William Penn Hotel, Pittsburgh.

Geologists from throughout the eastern areas are expected to attend the meeting. Information available on the little-known horizons and the prospects producing oil and gas from the deep formations will be presented.

Speakers will be George V. Cohee, geologist at the University of Michigan for the U. S. Geological Survey; Charles R. Fettke, professor of geology at Carnegie Institute of Technology; E. T. Heck, chief geologist for Quaker States Oil Refining Corp.; F. M. Swartz, professor of geology at Pennsylvania State College; Chilton E. Prouty, professor of geology at the University of Pittsburgh; Kendall E. Born, professor of geology at the Missouri School of Mines; A. C. McFarlan, head of the department of geology at the University of Kentucky; Coleman D. Hunter, chief of geology and research for Kentucky-West Virginia Gas Co.; R. C. Lafferty, Charleston, W. Va., consulting geologist; and G. Marshall Kay, professor of geology at Columbia University.

Mass-Spectrometer Group Meeting in Los Angeles

The sixth regular group meeting for owners and operators of Consolidated Engineering Corp.'s mass spectrometers will be held at the Biltmore Hotel in Los Angeles May 15-17. Sessions will be held on research, routine analysis, and new materials and techniques.

Principle speakers will include Dr. H. W. Washburn, vice president in charge of research, Consolidated Engineering; Dr. N. V. Naylor, Union Oil Co.; J. Alexander, Houdry Process Corp., and Martin Shepard, National Bureau of Standards. A large attendance representing research and operating departments of the major oil and chemical companies is expected.

Among the

Drilling Contractors

Mud Training Classes Are Announced

John Woodruff, state coordinator of petroleum-industry training, University of Texas, has announced the May schedule of mud-training classes. It is as follows:

May 5-16—Hobbs, N. M.
May 5-16—Angleton, Tex.
May 5-16—Three Rivers, Tex.
May 5-23—Kilgore, Tex. (advanced).
May 12-23—Harlington, Tex.
May 19-30—Eunice, N. M.
May 19-30—Bay City, Tex.
May 26-June 6—Holdenville, Okla.

M. J. Delaney Co., Dallas, will drill Continental Oil Co. 1 Royal, a 10,000-ft. Travis Peak wildcat, in the J. Crawford Survey, 2 miles northwest of Slocum in Anderson County, East Texas.

L. B. Jackson, Jr., is contractor on the Mercury Drilling Co. and P. G. Lake, Inc., 1 Beck, in NE SE SW 11-15n-8e. Contractor was moving in and rigging up for the venture, which is southwest of Bristow in Creek County, Oklahoma, about 1 mile south of production in Poor Farm field.

Meredith, Clegg & Hunt, Houston, have moved back in and are drilling on Humble Oil & Refining Co. 9 J. O. Phillips, in Flour Bluff field of Nueces County, Texas. Contract depth is 11,000 ft. This is the well on which operations were started in January of this year but was shut down by request of the Navy until end of the foggy-weather season.

Montgomery Drilling Co. has contract for McAlester Fuel Co.'s wildcat in NE SE 28-15s-6w, Ashley County, Arkansas. It will be the 1-A Crossett Lumber Co.

George P. Livermore, Inc., Lubbock, Tex., will drill an exploratory test to the Ellenburger on the Foster Rust ranch, southeastern Tom Green County, West Texas, for G. W. Strake, of Houston. It will be a rotary operation. The Ellenburger is expected around 6,100 ft., and it is scheduled to penetrate the zone about 200 ft. Location is SW SE Section 179, District 11, Southern Pacific Railway Co.

H. H. Rushing, toolpusher, and M. L. Swanson, F. F. Ivy, C. A. Bussell, J. F. Pyeatt and Pete Hall (driller), day-tour crew on one of two heavy-duty rigs being operated by Rocky Mountain Drilling Co. for Mountain Fuel Supply Co. in Church Buttes field, southwestern Wyoming

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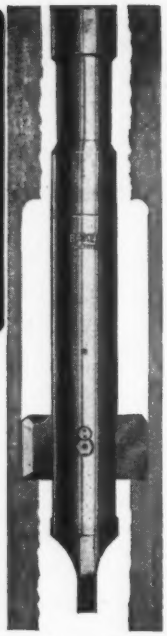

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Survey, A-2068, and some 19 miles southeast of San Angelo.

Dal-Tex Drilling Co. was reported to have a half interest in a wildcat project it will drill for J. C. Moore, in Kaufman County, East Texas. It will be the 1 Stanfield, in the Wesley Boles Survey, and will test to the Woodbine sand.

Spartan Drilling Co. has rig up at Lion Oil Refining Co. 1 Featherstone Unit, 27-17s-24w, in the McKamie field of Lafayette County, Arkansas.

Mealy-Wolfe Drilling Co. was rigging up rotary at its 1 Long, in SE NE NW 14-8n-9e, in the Long area of Hughes County, Oklahoma.

Lee Drilling Co. last week was rigging up rotary on Stanolind Oil & Gas Co. 1 J. J. Hegi, previously reported as the 1 E. E. Kersey, in southeastern Hale County, West Texas. It is an 8,000-ft. wildcat test, 5 miles southeast of Stanolind 1 E. L. Fisher, discovery well of the Petersburg field, in Section 7, Block S, C. F. Stephenson Survey.

J. I. Roberts will drill Arkansas Fuel Oil Co.'s 1 Creek. Location will be in the Midway field, Lafayette County, Arkansas.

Smith-Horton Drilling Co. will drill the Glen J. Smith 1 Durrett, a 6,000-ft. wildcat test in southwest Hale County, Texas, 1½ miles north and slightly west of nearest production in Irish field. The project will be 1,980 ft. from north and west lines of Section 7, Block DT, HE&WT Survey.

S. D. Johnson has drilling contract on the Potts & Grady 2 A. L. Whitaker, in south half of Section 956 of TE&L Survey, Throckmorton County, Texas. This will be a 4,000-ft. wildcat test in the shallow Manning-Parrott area.

Kirkpatrick & Bale, Inc., has drilling contract on the Kerr-McGee Oil Co. 1 Bridenthal, in NW SE NE 9-1s-3w, Carter County, Oklahoma, which was drilling at 370 ft. Contractor was also moving in to start the Allied Materials Co. 4 Gray-B, in NE NW SW 9-1s-3w, same county.

Bennett & Roberts Drilling Co. has operations under way at the 2 Leiker, in CN½ NE NW 14-15-18, an attempted ¼-mile east extension to Leiker pool, 3 miles south of the town of Munjor, in Ellis County, Kansas.

Martin-Harris Drilling Co. has contract to deepen the T. M. McKinney 1 Tung Oil Corp., wildcat in C NE NE 9-2s-11w, Stone County, Mississippi, northeast of Wiggins. The well was dry last year at total depth of 11,210 ft.

Conway Drilling Co. holds contract on the Tide Water Associated Oil Co. and the Seaboard Oil Co. 2 Dalby & Joiner, in the D. Puckett Survey, Bowie County, East Texas. This location is 500 ft. southeast of the No. 1, a failure in the Paluxy.

D. D. Thomas & Sons, drilling contractors, have returned to San Angelo, Tex., after making their headquarters in Artesia, N. M., the last 7 years. New offices will be in the McBurnett Building. Recent transaction involved the sale of a half interest in a quarter section, with four producers, for $80,000, and the purchase of three leases aggregating 421 acres, with a producing well on one of the tracts, for $100,000, in Sharon Ridge field in southwestern Scurry County, West Texas. John Summers, Odessa, Tex., purchased Thomas & Sons' half interest in the SE¼ Section 117, Block 97, H&TC Survey, which has four completed wells on J. L. Strain's land. The three leases purchased comprised the west 100 acres of Lot 17, J. S. Smith Survey; the east 127 acres of Subdivision 6, Kirkland & Fields Survey, and 194 acres in Lots 15 and 16, Kirkland & Fields Survey.

Max Spidel is drilling contractor on the Tri-County Development Co. 1 Albert Troost Estate, in C SE NE 11-5n-14w, Ottawa County, Michigan.

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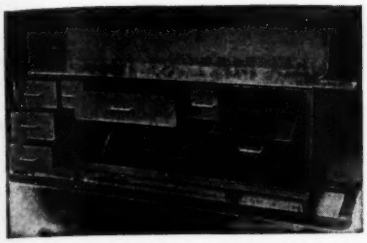

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NEW YORK CITY 20

John L. Webb Drilling Co. has staked the 3 G. A. Lewis et al, in NW NE SW 18-3s-11w, Cotton County, Oklahoma.

Tobe Wood is drilling contractor on the Cato Oil Co. (Wichita Falls) 1 G. B. Hamilton in northeast of Section 1,393 of TE&L Survey, Young County, North Texas. Location is 9 miles east of Olney and 1½ miles north of Cope field. Contract depth is 4,000 ft.

Mallard Drilling Co. is contractor on the Westgate-Greenland Oil Co. 1 Kafka, in SW NW SW 15-17-8, ¼ mile north of the Edwards pool in Ellsworth County, Kansas. Location is north of the J. C. Dozier and Derby Drilling Co. 1 Kafka, which was recently completed.

Lee and **Boone Cook** are drilling contractors on the Charles W. Cook 1 Hervg Estate, in NE NE SW 34-3n-13w, Allegan County, Michigan.

E. G. Norwood Drilling Co. had a dry hole at its 1 Dodson, in Section 49, Block 10, of H&TC Survey, Hardeman County, North Texas, wildcat 3 miles north of Chillicothe. Depth was 4,400 ft. The company has staked the 2 Dodson in the same section for a 7,000-ft. test.

Mercury Drilling Co. was starting its 1 Leroy Beck, in NE NE SW 11-15n-8e, for a 3,200-ft. test, in Creek County, Oklahoma.

Helmerich & Payne, Inc., was starting at the 1 Mahler, in the Luther Hopson Survey A-166, in the Manning area of Archer County, Texas, 5 miles southwest of Wichita Falls. Contract is for 5,400 ft.

A. Leon Derby, Jr., of Derby Drilling Co., has been named to the drilling contractors' committee of the Independent Petroleum Association of America. **W. R. Hunter,** of Barnett Drilling Co., has been named to the tax policy and advisory committee. **A. J. Bundy,** of Kiowa Drilling Co., is a member of the Interstate Oil Compact Commission committee, while **A. D. Barnett,** of Barnett Drilling Co., has been nominated to a post on the resolutions committee.

Barnett Drilling Co. has completed the 1 Anderson "B," in NW NE NW, Graham County, Kansas, as a maximum 3,000-bbl. well to extend Morel pool to Graham, Kans., ½ mile to the southwest. Barnett will drill Magnolia Petroleum Co. 1 Garvin, in SW SW SE 10-23-13, Stafford County, Kansas.

Goll, Graves & Mechling, Inc., have been awarded drilling contract on the Basin Oil Co. 3 Prevost, in N½ SE SW 2-14n-14e, Bay County, Michigan.

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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 3, 1947

	Total of all wells							Wildcat completions and discoveries										
						Cum.							Cumulative total, 1947					
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	17	8	0	*9	24,638	431	532	0	0	0	0	0	3	0	0	2	5
Pennsylvania	54	24	6	†24	84,834	1,022	1,351	0	0	0	0	0	0	0	0	0	0
West Virginia	11	1	10	0	32,230	267	240	0	0	0	0	0	0	0	1	0	1
Ohio	30	12	8	‡10	83,950	420	373	0	0	0	1	1	0	0	2	18	20
Indiana	9	3	0	6	16,991	185	104	0	0	0	2	2	5	0	0	15	20
Kentucky	17	4	1	‡12	34,647	172	145	0	0	0	4	4	5	0	0	18	23
Illinois	26	12	0	14	65,182	629	707	0	0	0	5	5	19	0	0	87	106
Michigan	24	4	11	9	45,197	201	231	0	0	1	9	10	3	0	5	67	75
Kansas	31	10	3	18	107,285	825	655	2	0	0	10	12	14	0	7	95	116
Neb., Mo., Iowa	0	0	0	0	0	2	7	0	0	0	0	0	0	0	0	2	2
Oklahoma	64	39	3	22	214,210	1,336	793	1	0	1	11	13	27	2	4	242	275
Texas	150	94	7	49	668,632	2,800	2,686	1	0	2	27	30	94	16	26	426	562
North Central (Dist. 7B & 9)	49	26	1	22	138,547	880	928	0	0	0	9	9	37	0	5	144	186
West (Dist. 7C & 8)	35	27	0	8	169,536	659	568	0	0	0	4	4	10	0	2	49	61
Panhandle (Dist. 10)	7	5	2	0	30,136	143	127	0	0	0	0	0	1	0	1	0	2
Eastern (Dist. 5 & 6)	6	2	2	2	38,724	161	252	0	0	0	2	2	2	0	1	39	42
Gulf Coast (Dist. 3)	26	19	1	6	156,263	529	616	1	0	1	4	6	22	11	11	89	133
Southwest (Dist. 1, 2 & 4)	27	15	1	11	135,426	428	195	0	0	1	8	9	22	5	6	105	138
Louisiana	25	15	1	9	153,292	390	423	0	0	0	3	3	12	7	2	53	74
Northern	12	8	1	3	40,072	189	217	0	0	0	1	1	0	0	0	30	30
Southern	13	7	0	6	113,220	201	206	0	0	0	2	2	12	7	2	23	44
Arkansas	5	2	1	2	16,759	78	65	0	0	0	0	0	0	0	0	12	12
Mississippi	7	4	1	2	65,648	117	82	0	0	0	0	0	0	0	1	24	25
Southeastern States	0	0	0	0	0	15	15	0	0	0	0	0	0	0	0	13	13
Montana	3	2	1	0	5,973	55	85	0	0	0	0	0	0	0	0	8	8
Wyoming	6	4	1	1	24,855	74	57	0	0	1	0	1	6	0	2	12	20
Colorado-Utah	3	0	0	3	9,701	57	42	0	0	0	2	2	1	0	0	11	12
New Mexico	7	6	0	1	32,224	173	127	0	0	0	1	1	4	0	1	13	18
California	38	33	2	3	171,447	659	617	1	0	2	3	6	17	0	2	95	114
Total United States	527	277	56	194	1,857,695	9,908	9,337	5	0	7	78	90	210	25	53	1,213	1,501
Total previous week	565	335	50	180	2,084,608	9,381	8,790	19	0	0	58	77	205	25	46	1,135	1,411
Total May 4, 1946	547	301	44	202	1,817,145			13	2	2	52	69	174	18	40	1,043	1,275

Service wells included: *9, †18, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.40	....	....	....
19-19.9	1.45	....	....	....
20-20.9	1.49	$1.55	....	$1.42
21-21.9	1.53	1.57	....	1.44
22-22.9	1.57	1.59	....	1.46
23-23.9	1.60	1.61	....	1.48
24-24.9	1.64	1.63	$1.86	1.50
25-25.9	1.68	1.65	1.88	1.52
26-26.9	1.71	1.67	1.90	1.54
27-27.9	1.75	1.69	1.92	1.56
28-28.9	1.79	1.71	1.94	1.58
29-29.9	1.82	1.73	1.96	1.60
30-30.9	1.86	1.75	1.98	1.62
31-31.9	....	1.77	2.00	1.64
32-32.9	....	1.79	2.02	1.66
33-33.9	....	1.81	2.04	1.68
34-34.9	....	1.83	2.06	1.70
35-35.9	....	1.85	2.08	1.72
36-36.9	....	1.87	2.10	1.74
37-37.9	....	1.89	2.12	1.76
38-38.9	....	1.91	2.14	1.78
39-39.9	....	1.93	2.16	1.80
40 and above	....	1.95	2.18	1.82

*For crude from Laboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED APRIL 26

District—	Crude runs, daily avg.	Production				Stocks at refineries, bulk terminals, in transit and in pipe lines			
		Gasoline†	Kerosene	Gas & dist. oil	Residual	Gasoline*	Kerosene	Gas & dist. oil	Residual
East Coast	753	2,000	290	1,132	1,479	22,222	4,589	9,676	6,257
Appalachian:									
District 1	100	305	42	96	85	2,650	169	356	243
District 2	69	215	15	70	107	1,130	40	82	101
Ind, Ill., Ky.	772	2,500	331	813	1,044	21,865	1,214	2,557	1,876
Okla., Kans., Mo.	392	1,335	207	421	456	10,319	317	1,113	902
Inland Texas	223	996	113	121	374	4,343	211	303	714
Texas Gulf	984	2,873	629	1,272	1,457	14,121	1,305	5,134	4,981
Louisiana Gulf	375	1,040	354	450	438	5,677	613	1,627	1,025
N. La. and Ark.	64	177	51	64	97	1,808	308	632	110
Rocky Mountain:									
New Mexico	11	37	4	9	20	78	16	37	48
Other	123	379	24	138	234	2,996	57	484	659
California	859	2,356	63	849	2,395	16,651	885	10,285	25,752
April 26, 1947	4,725	14,213	2,123	5,435	8,186	103,860	9,724	32,286	42,668
April 19, 1947	4,709	13,966	2,007	5,263	7,961	105,592	9,308	31,470	42,749
April 27, 1946	4,675	14,037	1,943	5,680	9,040	99,320	10,933	31,512	39,285

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 235,383,000 bbl. as of April 26—up 1,332,000 bbl. One year ago 221,689,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$1.95
Kettleman Hills, California*	1.94
Beauregard Parish	1.90
Illinois Basin	2.07
Pecos County, Texas (Yates)	1.65
Bradford, Pennsylvania	3.51
Eastern Ill. and Western Ind.†	2.07
Tomball, Texas Gulf Coast	2.10

*37°-37.9°. †35° and above.

TRENDS

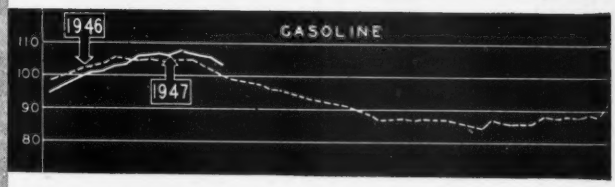
DAILY AVERAGE PRODUCTION FOR WEEK

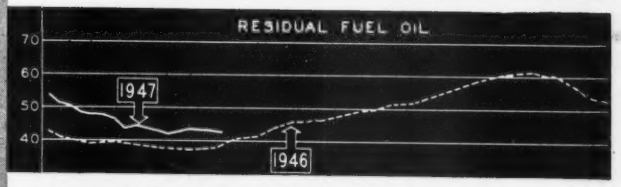
	May 3 crude oil	B. of M. Apr. demand	Apr. 26 crude oil
Alabama	650	1,200	350
Arkansas	80,950	79,000	80,100
California	908,300	860,000	910,750
Colorado	39,390	38,000	39,010
Eastern	64,500	65,200	64,500
Florida	540	200	550
Illinois	185,700	210,000	185,300
Indiana	18,200	18,000	18,000
Kansas	279,750	275,000	281,200
Kentucky	24,900	29,000	25,500
Louisiana	418,345	410,000	416,155
North Louisiana	104,150	.....	103,550
South Louisiana	314,195	.....	312,605
Michigan	39,705	47,000	40,230
Mississippi	86,900	84,000	86,890
Montana	22,390	24,000	23,290
Nebraska	600	700	600
New Mexico	103,385	102,000	103,155
Oklahoma	385,800	380,000	386,450
Texas	2,183,505	2,120,000	2,150,545
Dist. 1 (Southwest)	20,850	.....	20,664
Dist. 2 (Southwest)	158,335	.....	157,957
Dist. 4 (Southwest)	242,370	.....	241,971
Dist. 3 (Gulf Coast)	481,905	.....	483,443
Dist. 5 (Eastern)	38,130	.....	38,147
Dist. 6 (Eastern)	111,770	.....	111,284
East Texas field	335,860	.....	325,571
Dist. 7C (West)	36,440	.....	35,697
Dist. 8 (West)	498,570	.....	480,710
Dist. 7B (W. Central)	37,360	.....	36,768
Dist. 9 (N. Central)	136,655	.....	133,543
Dist. 10 (Panhandle)	85,260	.....	84,790
Wyoming	109,710	106,000	113,110
Miscellaneous	.....	700	.....
Total United States	*4,953,220	4,850,000	4,925,685
Change from prev. wk., up	27,535		

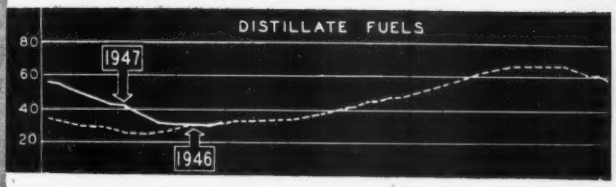
Total production January 1-May 3 ..... †594,031,285 bbl.
Same period last year (crude plus cond.).. 572,650,887 bbl.

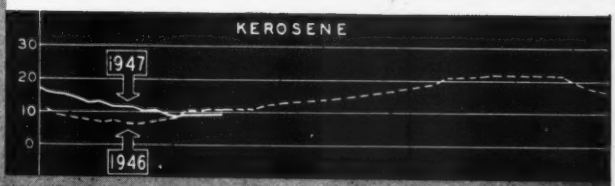
*Not incl. 34,450 bbl. condensate. Incl. 3,250,550 bbl. condensate.

OIL STOCKS IN THE UNITED STATES

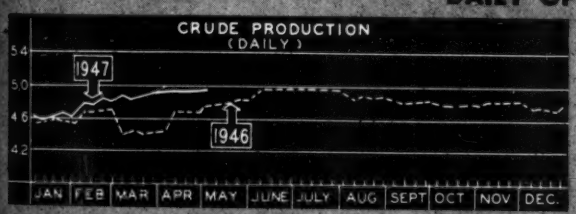


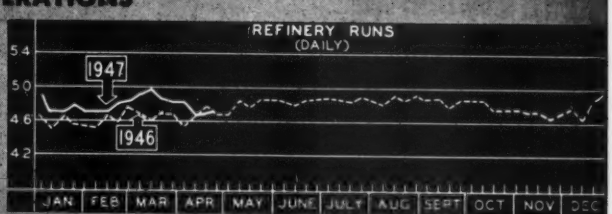




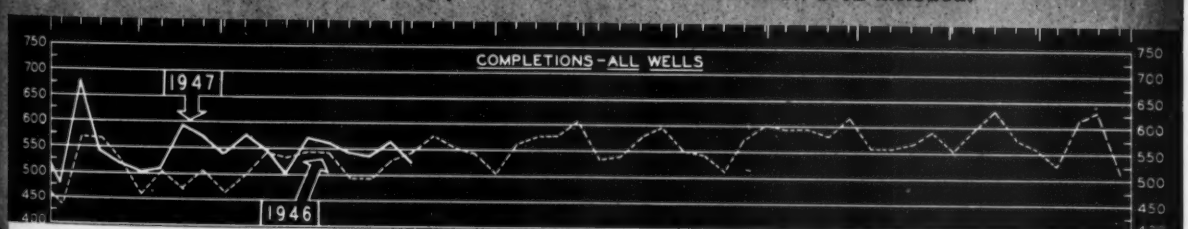


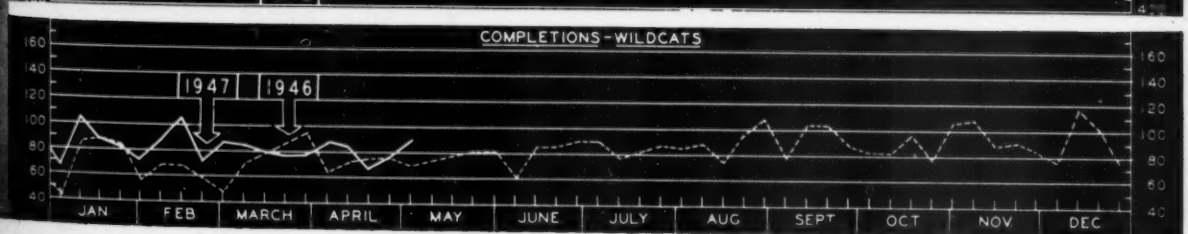
DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.





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MARKETS

Standard Oil Co. (Ind.) effective April 25 adjusted upward its posting for crude oil from Rangely field. Under the new schedule the company will pay $1.55 a barrel for crude below 21° gravity with a 2-cent differential to $1.95 for oil of 40° gravity and above. The adjustment represents an increase of 10 cents a barrel.

SKYROCKETING prices for No. 6 fuel oil and a 0.3-cent a gallon reduction in the tank-wagon price of gasoline by Standard Oil Co. of California highlighted developments during the past week in 1947's unusual petroleum-products market.

Spot-market quotations for No. 6 outstripped crude prices as brokers and consumers were reported offering as high as $2.25 a barrel for the products. The high offerings were being made on the basis of immediate shipment in the suppliers' own tanks. One independent refiner said he had orders for 50,000 bbl. of No. 6 at the $2.25 figure.

The jump in spot-market quotations followed a recent increase from $1.36 to $1.60 in the price of No. 6 in many railroad contracts. In New York the posting for No. 6 remained at $2.22, but premiums of 5 to 15 cents were being offered. Demand for the product in North Texas was reported "extra heavy."

Suppliers suggested the increased demand might be due in part to efforts of large coal-consuming concerns to "hedge against Lewis" and in part to the natural-gas shortage, which has forced plants to turn to fuel oil as a standby fuel. Reports also were heard that several large concerns are stocking liquefied petroleum gases as standby material.

California Standard's Action

Standard of California's retail price reduction, according to R. G. Follis, president, was an answer to President Truman's appeal to combat inflationary trends by lowering commodity prices. The reduction was made effective May 2. Follis said the price cut was not justified from a business standpoint "when the costs of crude oil and its manufacture into refined products were taken into consideration," but that the company "appreciates the significance at this time of effecting the reduction for the national welfare."

All products over the nation remained "as tight as possible," according to observers, who predicted a possible general advance in the price of gasoline resulting from the current and expected shortage. A further advance in price of crude also was prominent in conversations.

Heating Oils Being Stored

Although the urgency of demands for light burning oils dropped off following the end of cold weather, demand was still strong for the products as dealers in the East and North were reported filling storage tanks in anticipation of heavy fall requirements and encouraging consumers to fill their home storage facilities. Buyers in some areas were reported increasing storage capacity to facilitate year-round purchasing.

Tank cars still were far from plentiful, although the situation was reported "coming back to normal."

Representative Quotations

Representative spot-market quotations of leading suppliers as of last Monday. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel.

GASOLINE, KEROSENE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	8-8.5	10.1-10.4* 9.2- 9.4†	7.75-8
Premium gasoline, 78-80 octane	8.75-9.5	10.2-12	8.5 -9
42-44 w.w. kerosene	6.875-7.25	7.8	6.75-6.875
No. 2 straw fuel oil	6.125-6.625	6.8-6.9	5.5-5.75
No. 6 residual	$1.80-2.15	$2.22	$1.55-1.70

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.375	4.875	5.125
Grade 18-55	6.45	5.85	6.15

LUBRICATING OILS

Mid-Continent

150-160 vis. D bright stock, 0-10 p.p.	29
200 vis. No. 3 neutral, 0-10 p.p.	18-20

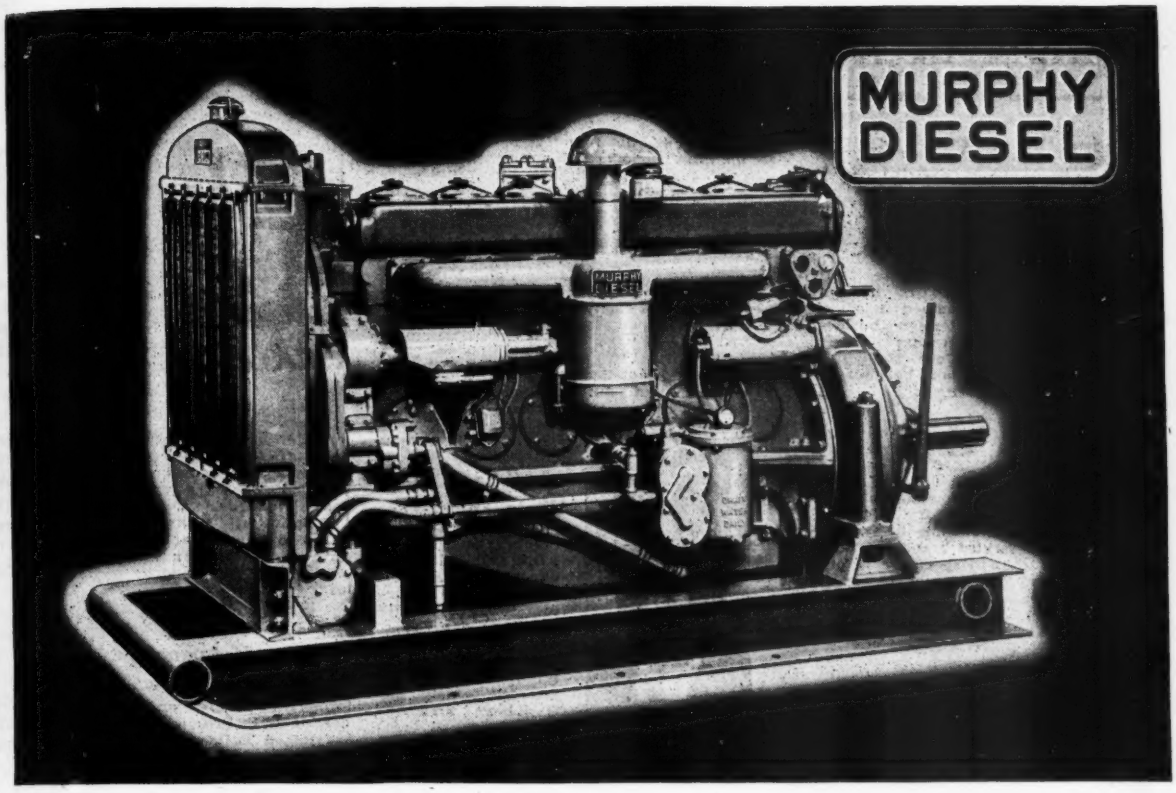
LUBRICATING OILS

South Texas

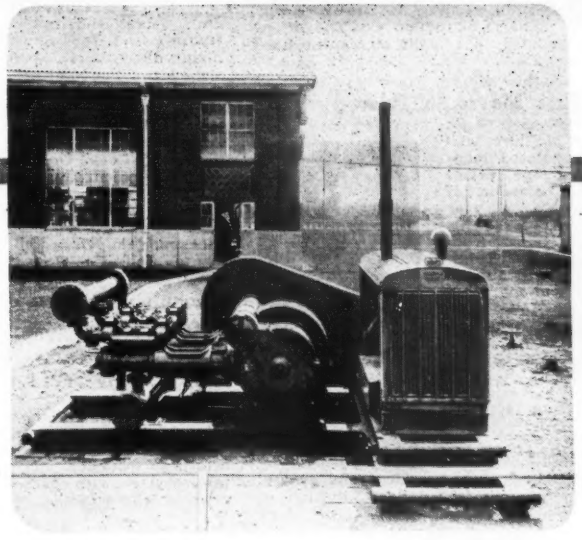
200 vis., No. 2-3 neutral	11-12.5
750 vis., No. 3-4 neutral	13-15.25
2,000 No. 5-6 neutral	14.5-16.75

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	ct
180 vis. 0 p.t. neutral	ct



Powered by a MURPHY DIESEL ME-66, 6-cyl., 6 x 6½", 150 HP continuous, 180 HP intermittent, this Wheatley Plunger-Type Pump (85 strokes per minute) is pumping 300 barrels per hour for Texas Empire Pipe Line Co., Hayworth, Illinois.



Powered for Big Capacity Pumping

When you've got good equipment powered by MURPHY DIESEL, that's a team that can't be beat. MURPHY DIESELS have proved to oil men that these rugged, dependable engines get more work done, at low cost, for more years, at better profit. Whether it's pumping, drilling, or other heavy oilfield work you want done, keep reliable, compact, heavy-duty MURPHY DIESELS teamed up to good equipment for big results.

See your nearest MURPHY DIESEL Dealer or write for bulletin.

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DIESEL ENGINES: 90 HP TO 215 HP

MURPHY DIESEL

GENERATOR SETS: 60 KW TO 115 KW

Dependable Heavy-Duty Power

Equipment Men in the News

Houdry Names Pineau to Foreign Advisory Post

Col. Louis Pineau, president of the Permanent Council of World Petroleum Congresses (London), has been named an advisor on foreign business to Houdry Process Corp. He will maintain headquarters in Paris.

Black, Sivalls & Bryson Opens Lubbock Branch

Floyd C. Myers, regional manager of Black, Sivalls & Bryson, Inc., Kansas City, Mo., announces the opening of a new company sales and service branch at Lubbock, Tex. The branch will specialize in oil-field equipment, and will also act as an outlet for special products. Clint G. Ross, who for the past several years has managed the Artesia, N. M., branch, will direct the new operations.

Lane Added to Brown & Bergstrom

E. V. Lane, formerly of Bechtel, McCone, Parsons Co. has become associated with Brown & Bergstrom Construction Co. With this new association the name of the company has been changed to Brown, Bergstrom & Lane Construction Co. The offices of the company are in the Mercantile Bank Building, Dallas.

McClure Moves to Tulsa

J. N. McClure, who was appointed manager of the petroleum division of Elliott Co. a year ago, has moved his headquarters from Houston to Tulsa. McClure will also be manager of the Tulsa district. He has served as field engineer in the Philadelphia, St. Louis, and Tulsa offices before becoming Kansas City district manager in 1941.

Ballagh Tours Europe

J. C. Ballagh, vice president and general manager of Patterson-Ballagh division of Byron Jackson Co., departed from New York via Pan-American Air Lines recently for a 6-week business trip to England and the continent. He plans to spend about 4 weeks in England and will headquarter at the office of H. F. Towler, 9 Cavendish Square, London. Later he will go to France. He is expected to return to the United States the latter part of June.

Lufkin Opens New Foundry

The new gray-iron foundry of Lufkin Foundry & Machine Co., Lufkin, Tex., was recently opened in connection with the Texas Chapter meeting of American Foundrymen's Association. The new foundry, located in the center of a 68-acre tract, has a melting capacity of 160 tons per 8 hours. The main bay with four 10-ton cranes is 60 ft. wide and 780 ft. long. Two 70-ft. cupolas, each capable of handling 20 tons per hour, are used on alternate days. This foundry is equipped with the most modern handling devices for coke, pig iron, scrap, etc.

Cummins Engine Appoints Export Representative

Cummins Engine Co., Columbus, Ind., announces the appointment of the newly formed Mid-Continent Cummins Export Corp. as export representative. Export offices are located at 42 Broadway, New York City; 6220 Navigation Boulevard, Houston; Mid-Continent Building, Fort Worth; Milam Building, San Antonio; 811 Howard Street, New Orleans, and in the Petroleum Building, Los Angeles.

Caribbean Field Engineer

John M. Carver, associated with the export department of Caterpillar Tractor Co., Peoria, Ill., for the past year, has been appointed field engineer to serve the company interests in the Caribbean area.

Hydro-Power, Inc., Appoints Southern Dealers

Appointment of a southern regional manager and five dealers for hydraulic power units, valves, and controls manufactured by Hydro-Power, Inc., Springfield, Ohio, is announced by L. R. Cano, sales promotion manager of the company. Joseph C. Tourne, General Engineering & Equipment Corp., 618 Carondelet Bldg., New Orleans, has been appointed regional manager for the southern section of the United States. American Machinery Corp., Orlando, will handle company equipment in Florida; Jack Fanning, Atlanta, in Georgia; Riddell Engineering Co., Inc., Birmingham, in the state of Alabama; Southern Engineering & Supply Co., Vicksburg, in Mississippi; and D.B.A. Engineering Sales Co., Houston.

Consulting Engineering Firm Formed

J. H. Howard, B. F. Johnson, and C. A. Vogt, formerly of J. H. Howard & Co., Dow Chemical Co., and Cameron Iron Works, respectively, have announced formation of a partnership, Howard, Johnson & Vogt, Consulting Engineers, Houston, offering mechanical and electrical engineering service, with particular reference to oil-field equipment.

Petro-Tech Service Co. Organized

Russell Keener and Keith Miner, former Lane-Wells Co. employes, have organized Petro-Tech Service Co. to provide gun perforating and allied services to operators in the western Venezuela producing oil fields. They will also represent several oil-tool manufacturers. Keener and Miner will maintain headquarters in Maracaibo.

Moore New Sales Manager

Thomas F. Moore has recently been appointed sales manager of Mutual Chemical Co. of America, according to a notice issued by its president, George A. Benington. Moore has been with Mutual since July 1943, and prior thereto was for 7 years with General Chemical Co., first in New York and Cleveland, then as manager of the Detroit sales office.

National Tube Makes Sales Changes

Earle E. Smith has been appointed manager of sales in charge of National Tube Co.'s Houston office. Smith was formerly

EARLE E. SMITH

G. F. COONS

manager of sales at the company's Tulsa sales office. He succeeds Forrest A. Marsh, who has been named assistant to the vice president in charge of sales at the company's headquarters in Pittsburgh. Replacing Smith at Tulsa is G. F. Coons, who has been manager of the New Orleans sales office since 1942. Thomas W. Thorne succeeds Coons as manager of the New Orleans sales office.

Nelly Joins Refinery Maintenance

H. M. (Bill) Nelly, well-known engineer formerly in charge of the petroleum division of J. F. Pritchard & Co., in Houston, has joined Refinery Maintenance Co., Los Angeles, and plans to make his headquarters eventually in the Los Angeles area. For the present he remains at Houston.

Gleason New Export Sales Division Manager

In a move to strengthen its export sales department, Kaiser Co., Inc., Iron and Steel Division, has announced appointment of W. J. Gleason as export sales manager.

Advanced Exploration Reorganizes

Advanced Exploration Co., Inc., of Houston, Tex., recently reorganized. Active stockholders are: George D. Mitchell, Jr., president; C. W. Bocock, first vice president; A. I. Bartow, second vice president; Louis Poindexter and F. Ritchey Wallace. Miss Joe Doss is secretary and treasurer.

SSC Transfers Cornish

Lou G. Cornish, supervisor with Seismograph Service Corp., is being transferred from Tulsa to Lafayette, La., where he will join American Exploration Co., a recently acquired subsidiary of S.S.C. Cornish is the vice president in charge of interpretation of over-water seismic prospecting. He worked up from the ranks through the positions of shooter, surveyor, computor, party chief, and supervisor. In 1936 he spent a year for S.S.C. in Rumania.

Bethlehem Advances Stephenson

Bethlehem Supply Co., Tulsa, announces the recent promotion of W. E. Stephenson to district manager of the North Central Texas district with headquarters in the Wichita Falls store. Stephenson had 6 years' experience in the oil-field-supply business, being employed by Bridgeport Machine Works, and Bovaird Supply Co. prior to his affiliation with Bethlehem.

Sturtevant Announces Southwest Branch Offices

To serve the Southwest, the Sturtevant Division of Westinghouse Electric Corp. has recently announced establishment of a district office in Dallas, and a branch office in Houston. H. J. Waggle has been appointed southwestern district manager and will be located in the Dallas office, and F. M. Mayse, branch manager, Houston office. The Dallas office will handle applications in Oklahoma, New Mexico, and the northern half or Texas. The Houston office will handle the southern half of Texas.

Nordberg Appoints Adams and Beck

Nordberg Manufacturing Co. announces appointment of Joseph T. Adams as sales engineer in its heavy-machinery division. He will have his headquarters in the newly established district office in the Cotton Exchange Building in Dallas. Charles E. Beck has been appointed special representative of the heavy machinery division. At present Beck will have his headquarters at the Busch-Sulzer division of Nordberg at St. Louis.

Vernon and Keffer Named Store Managers

Continental Supply Co. has announced the appointment of F. S. Vernon as store manager at Carthage, Tex., succeeding F. N. Metcalf who has been made foreign representative. Vernon was formerly a field salesman at Shreveport. James E. Keffer, formerly floorman at McCamey, Tex., has been named store manager at that point. He succeeds R. K. Thompson who has resigned.

Charles Bruning Company Celebrates Fiftieth Year

In 1897 Charles Bruning established a company, Charles Bruning Co., Inc., in New York with only a few hundred borrowed dollars as capital. The shop at that time carried a modest supply of drawing materials, tracing papers, and other staple items. Today, on its fiftieth anniversary, the company serves every section of the United States in the field of sensitized papers, drafting and engineering equipments, and materials.

Stratton New Director of Purchases

W. T. Stratton has been appointed director of purchases of the Wickwire Spencer Steel Division of Colorado Fuel & Iron Corp., and will be located at the Curtiss Building, 361 Delaware Avenue, Buffalo. Stratton will replace E. A. Johnston, who has resigned.

Rollway Opens Pittsburgh Office

A new sales office of Rollway Bearing Co., Inc., Syracuse, has been opened in Pittsburgh, with John B. Bell, sales representative, in charge. Address of the new office is Room 507 Renshaw Building, Ninth Street at Liberty, Pittsburgh. Bell, who for several years has served as sales representative with headquarters at the Syracuse home office, began his new assignment April 15, it is announced by H A. Pierce, sales manager.

U. S. Steel Supply Erects New Warehouse

Work of erecting a new St. Louis warehouse building for United States Steel Supply Co. at Sarah and Duncan Streets has been begun and is proceeding rapidly, Lee F. Niemann, St. Louis district manager for this U. S. Steel subsidiary, announces. Construction of the new building, which was planned early in 1945, was delayed due to extended delivery schedules of fabricated steel which made it impossible to begin the steel erection until this month. It will be equipped with up-to-date cutting, processing, and handling facilities, and will consist of four aisles, each about 375 ft. long, and one transverse aisle which will expedite the zoning and loading of steel for shipment.

Fiske and Keck Tour South America

Harry M. Fiske, of Ingersoll-Rand Co.'s petroleum division, accompanied Superior Oil Co.'s vice president, Howard B. Keck, on a tour of South America, stopping at Bogota and Lima among other places.

Reese Regional Sales Manager

A. B. Reese, Jr., has been appointed regional sales manager at Fort Worth of the Superior Engine Division of The National Supply Co. Reese, an engineering graduate of Ohio State University, has been assistant chief engineer of the division's Springfield, Ohio, plant.

Crotts Big Four Illinois Representative

Chester L. Crotts has been appointed sales representative for Big Four Machine & Supply Co., Clay City, Ill. Crotts served throughout World War II as navigator on photo reconnaissance with 15 months service in the C-B-I theater. Crotts will make his headquarters at Flora, Ill.

New Leslie Agents

Leslie Co., Lyndhurst, N. J., announces the appointment of the following agents to handle industrial sales and service: Plant Equipment, Inc., Minneapolis; Fluid Equipment Co., Dallas; Avery M. Walsh & Sons, Albany, N. Y.

Two hundred visitors were attracted to the Texas Chapter meeting of American Foundrymen's Association which was held in connection with the recent opening of the Lufkin Foundry & Machine Co.'s new gray-iron foundry

Nichols and Livengood Named by LeTourneau

Robert P. Nichols has been appointed assistant domestic sales manager for R. G. LeTourneau, Inc. Bose J. Livengood, for-

R. P. NICHOLS

B. J. LIVENGOOD

mer LeTourneau export representative for Alaska, Canada, Newfoundland, and Hawaii, has been named installations engineer for the company's export division.

Baird Supply Export Representative

Hinderliter Tool Co., Tulsa, a division of H. K. Porter Co., Inc., Pittsburgh, has announced the appointment of Baird Supply Co., New York, as export distributors for well-head equipment, blowout preventers, rotary-tool joints and other related products. John H. Baird and Jack W. Askins are president and assistant manager respectively of Baird Supply. They maintain offices at 420 Lexington Avenue, New York.

Iddles a Director of Babcock & Wilcox

Alfred Iddles, who has been associated with Babcock & Wilcox Co. since 1937 and a vice president since 1945, has been elected a director of the company, A. G. Pratt, president, announces. Directors reelected include: Pratt, E. G. Bailey, John Foster Dulles, C. W. Middleton, Robert C. Stanley, B. A. Tompkins, and John C. Traphagen.

Smallman Appointed Director of Sales

Phillip Fogg, president of Consolidated Engineering Corp., Pasadena, Calif., announces appointment of Robert Smallman as director of sales and field engineering. Smallman comes to this organization after 14 years of technical research, publicity, and sales work.

Parker Sales Manager Of Brewster

Phil Parker has been appointed general sales manager of The Brewster Co., Shreveport. Parker has been engaged in the drilling division of the industry for the past 13 years. Prior to joining Brewster he was toolpusher for Spartan Drilling Co. Bud Lewis and Herbert Wenk have recently joined the company as field representatives. Wenk has just returned from a trip through Canadian oil fields.

Berghoff Advertising Director

Guy Berghoff, director of public relations for Pittsburgh Plate Glass Co., will assume direction of all the company's advertising activities, according to an announcement by Harry B. Higgins, president of the firm. The company, which produces glass, paints, chemicals, and brushes, will continue to maintain separate advertising departments in these four divisions. The firm also operates an extensive warehousing and stores system throughout the country.

Classified Advertising

The Market Place for the Oil Industry

EQUIPMENT FOR SALE

SPUDDER—Fort Worth Spudder D located on siding in Tulsa. Travco Equipment Co., 110 Midco Bldg., Tulsa, Oklahoma. Phone 5-2251.

FOR CABLE TOOLS
see
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

LUMBER FOR SALE: 3x6 and wider 10 to 16 rough Oak $58.00 f.o.b. mill. E. J. Gaiennie, Lumber, Box 1074, Shreveport, Louisiana.

WELL DRILLING Machines, Spudders, Core drills, Standards. Complete stock cable tools. Used equipment reconditioned. Some Government surplus. Pressey & Son, Pueblo, Colorado.

FOR SALE: Pumping Units. All types & sizes. New and used. Bridgeports, Jensens, Americans, Atlas, Ideco, with or without Power. Glenn Supply Co., 3600 Sand Springs Road. Phone 3-9607, Tulsa, Okla.

FOR SALE: Double drum Dietle casing puller with Fordson power, 50' mast and tools. Also pole trailer and float. R. S. Hanson, 5454 N. Broadway, Phone 4-4862, Box 2102, Kansas City, Kansas.

FOR SALE: 6—5,000 bbl. New A.P.I. Bolted steel tanks. 7—10,000 bbl. New A.P.I. bolted steel tanks. Also 1,000 bbl., 500 bbl. new A.P.I. steel tanks. New and used grain tanks. Welded steel tanks. Independent Tank Mfg. Co., Seminole, Oklahoma. Phone 977.

FOR SALE: 2—Complete rotary rigs with 94 foot masts and drill pipe, One with Cardwell drawworks with GAK Waukesha motors, Gardner-Denver Pump; One with unit rig drawworks with D-13000 caterpillar motors, Ideal C-150 pump. The following additional equipment: 3700 feet 3½ OD drill pipe with Reid full hole tool joints. 3—4½ OD drill collars. 2—Overshot sockets for 3½ drill pipe. 1—Regan 5-sheave 100 ton crown 30" diameter sheave, 1" groove. 1—Regan 4-sheave 80 ton crown 30" diameter sheave, 1" groove. 1—American Well Prospecting Co. 5-sheave, 125 ton crown 36" diameter sheave, 1½" groove. Complete information furnished upon request. All of above in good condition. Write or call Kiowa Drilling Company, 717 Union National Bank Building, Wichita, Kansas. Phone 3-8013.

175 — 100 BBL.
NEW A. P. I.
BOLTED TANKS
Stock Shipment
L. M. STANHOPE
Rosemont, Penna.

EQUIPMENT FOR SALE

FOR SALE: Six New Kobe, 2½ inch tubing insert, pumps, one Triplex—Bargain for immediate sale. Ben Beckham, Jr., Box 134, Overton, Texas. Phone 3921.

FOR SALE: One 7¼ x 10" and one 7¼ x 14" Gardner Denver pumps—overhauled—good condition. Also, one 82 CFT Gardner Denver Air Compressor. Drillers Machine Shop, Box 4532, Oklahoma City 9, Okla., Phone 6-3281.

FOR SALE: One Wilson Super Spudder, powered by completely reconditioned PA-100 motor, complete with mast and 5,000-ft. drilling and sand line. Located at Plainville, Kansas. Phone 1338, Hays, Kansas. Price $7500.00.

FOR SALE: 10,000 Ft. Used 2⅞" O.D. E.U.E. 6.50 Weight, Range 2, Grade H-40, 10 Thread Seamless Tubing 10,000 Ft. Used ¾" A.P.I. Axelson No. 59 pin and pin Sucker Rods. Price tubing and rods combined, fifty cents per foot.
Box 778, Ardmore, Oklahoma.

FOR SALE
12—230 H. P. Bessemer and Clark horizontal Engines with new 17" Power Heads complete with compressors in first-class condition.
ENGLE PETROLEUM, INC.
P. O. Box 72
MT. CARMEL, ILLINOIS

New and Used
VALVES and FITTINGS
VICTORY SUPPLY COMPANY
Phone 5-2073 **P.O. Box 754**
Tulsa, Oklahoma

FOR SALE
STEEL STORAGE TANKS
63—10,000 Gallon Capacity Tank Car Tanks
CLEANED PAINTED TESTED
Located in Oklahoma
IRON & STEEL PRODUCTS, INC.
42 years' experience
13412 S. Brainard Avenue
Chicago 33, Illinois. PHONE BAYport 3456
"ANYTHING containing IRON or STEEL"

EQUIPMENT FOR SALE

1 Jumbo-D Fort Worth Spudder, International Power. Koehler light plant and dog house—no tools—in perfect condition. Box B-708, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1—Wichita 66 Spudder, 1—LeRoi engine, tools from 15½ to 7 inch. Kroeler light plant outfit complete. Priced to sell. Phone 589, Walter A. Hale, P. O. Box 2437, Cut Bank, Montana.

USED SHOT HOLE DRILLS
These drills are mounted on trucks and vary in size and in condition. May be seen at 8806 Lemmon Avenue, Dallas, Texas. Phone Dixon 4-2671.

OILFIELD TANDEM TRUCKS
Whites-International-Macks-Misc. full rigged for oilfield work or ideal for mounting heavy units or rigs. G. G. Clayton, Houston, Texas, P.O. Box 1671. Telephone Keystone 3-1361.

FOR SALE: 1—14" x 14" Ideal horizontal twin cylinder steam drilling engine. 2—15½" x 8½" x 20" Ideal steam slush pumps. Excellent condition. Priced right.
Lucey Products Corporation,
Tulsa, Oklahoma.

WIRE ROPE
Brand New—On Original Reels
450,000 Ft. Hemp Center
254,400 ft.—¼"—6x7 High Grade Plow Steel Galv. Preformed.
160,000 ft.—¾"—6x37 Improved Plow Steel Preformed.
15,000 ft.—⅞"—6x12 Plow Steel Galvanized.
6,000 ft.—1¼"—6x37 Plow Steel Galvanized.
19,000 ft.—1¼"—6x37 Plow Steel.
Manufactured by the Nation's leading wire rope companies.
Save up to 50%.
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BROWN - STRAUSS CORP.
Box 78 **Phone HA. 1000** **K. C., Mo.**

WE BUY and SELL
Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves
SONKEN-GALAMBA CORP.
2nd & Riverview, Kansas City 18, Kans.

HYDRAULIC PUMPS
Aldrich Pump Co. Vertical Triplex HYDRAULIC PUMPS, 2¾" x 8", equipped with Herringbone gears, 67.5 GPM. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate.

Motors are 75 HP, 3/60/220-440 volts, 1740 RPM. Complete with starting panel, consisting of G.E. motor starter switch, push button control, square "D" Switch, and capacitator.

Purchased new 3½ years ago. Excellent condition. Available for immediate delivery.

CONSOLIDATED PRODUCTS CO., INC.
17-20 Park Row, New York, N. Y.

REFINERY EQUIPMENT FOR SALE

One—3" Pacific Hot Oil Pump, ten stage, direct connected to 600 H.P. 3 stage, G. E. Steam Turbine.
One—3" Pacific Hot Oil Centrifugal Pump, seven stage, direct connected to 400 H.P. 3 stage, G. E. Steam Turbine.
One—30 x 7 x 20 Burnham Twin Simplex Hot Oil Pump.
1,975 Ft.—3¼ I.D. x 4¼" O.D. Tubing, 4-6 Chrome—in 25-ft. lengths, plain end.
One—Fractionating Tower, 6 ft. x 39 ft. x ⅜" shell—20 steel bubble trays.
Two—5 ft. x 30 ft. Pressure Vessels, lined with lead and acid resisting brick.
Pressure vessels to 30,000 gals. capacity, Centrifugal and Reciprocating Pumps, Heat Exchangers, Valves.

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